

A STUDY OF AFRICAN CHIRONOMIDAE  
PART I

BY  
PAUL FREEMAN *xy*

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# A STUDY OF THE CHIRONOMIDAE (DIPTERA) OF AFRICA SOUTH OF THE SAHARA

## PART I

By PAUL FREEMAN

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### SYNOPSIS

This is the first of a series of papers describing as far as it is at present possible the Chironomid fauna of Africa south of the Sahara. The introductory matter includes a historical survey of the numbers and distribution of species hitherto described; notes on collecting, preserving and examining specimens; a brief account of the distribution of some of the commoner species; and finally short chapters on the structure and variation of the adults with special reference to characters of taxonomic importance.

There is a key to the subfamilies followed by keys and descriptions of the genera and African species of the subfamilies Tanypodinae, Diamesinae and Clunioninae. A key to the genera only is given of the Podominae, of which no African species are yet known. Descriptions are given of new species and redescriptions where possible of those previously described both by the present and other authors. Fifty-seven species are dealt with, nineteen of them new, and there is a good deal of new synonymy.

THIS is the first part of a study of the adult Chironomid fauna of the mainland of Africa south of the Sahara, based mainly on the collection of the British Museum (Natural History), supplemented by those of the Institut des Parcs Nationaux du Congo Belge, the Musée Royal du Congo Belge and the Institut Royal des Sciences Naturelles de Belgique. I consider the Ceratopogonidae to be a separate family.

The study is not a revision in the strict sense because I have not been able to identify all the species (nearly 300) described by Kieffer. I am, however, including as many

redescriptions of his species and genera as possible, and notes on all the others. I am also describing new species, redescribing both Goetghebuer's and my own species, and giving keys and figures to assist in identifications. It is hoped that publication of the study will encourage collecting so that the remainder of Kieffer's species may be found again.

Africa south of the Sahara and the associated islands off the east coast are usually referred to by zoologists as the "Ethiopian Zoogeographical Region." It is not a very satisfactory term because Ethiopia is the name of a country and therefore there is confusion when the adjective "Ethiopian" is used. I am not including a full account of the fauna of the Malagasy Sub-region (Madagascar and associated islands), except for the Seychelles, because I have no material from there. I am, however, including such account as is possible of the material from the Seychelles collected by the Percy Sladen Trust Expedition 1905 and reported on by Kieffer. Some Sudanese species extend along the Nile into Lower Egypt and for these species it is necessary to extend the limits of the Region under consideration. With this exception, wherever I have used the adjective "African" I am meaning Africa south of the Sahara.

I wish to thank Dr. A. J. Hesse of the South African Museum, Cape Town, for lending me the types of S. African species described by Kieffer; also Dr. Ferenc Mihályi of the Hungarian National Museum for the loan of other Kieffer types.

I would like to thank the Director of the Institut des Parcs Nationaux du Congo Belge, Dr. P. L. G. Benoit of the Musée Royal du Congo Belge and Dr. Per Brinck of the Lund Universitets Zoologiska Institution for placing the large collections of their Institutes at my disposal.

Dr. K. M. F. Scott and Mr. A. D. Harrison of the University of Cape Town have made big collections of specimens in excellent condition and I am much indebted to them, both for sending me the material for working out and for presenting much of it, including the types of new species, to the British Museum (N. H.).

Other large collections have been sent to me from the Anglo-Egyptian Sudan by Mr. D. J. Lewis, Stack Medical Laboratory, and by Mr. E. T. M. Reid, Tsetse-fly Reclamation Service. Smaller lots of material have been received from M. R. Tollet, Institut Royal des Sciences Naturelles de Belgique; Dr. A. Villiers, Institut Français d'Afrique Noire, Dakar; M. J. Hamon, S.G.H.M.P., Bobo Dioulasso, Haute Volta; Mr. R. Crosskey, Medical Dept., Nigeria; Prof. Dr. Fritz Peus, Zoologisches Museum der Universität, Berlin; and Prof. Dr. E. Lindner, Staatliches Museum für Naturkunde, Stuttgart. I wish to give my thanks to all these for their co-operation.

The British Museum material includes the collections made by the late Dr. F. W. Edwards on the British Museum Ruwenzori Expedition (1934-5).

#### HISTORICAL SURVEY

Single species of African Chironomidae have been described by Walker, Wiedemann, Edwards, Hesse and Hinton, but prior to 1950 the vast majority of known species were described by Kieffer and Goetghebuer. Since 1950 and prior to the publication



of this study I have published descriptions of a number of species. The numbers involved are as follows :

Kieffer . . .	286 species
Goetghebuer . .	82 "
Freeman . . .	78 "
Other Authors . .	6 "
	<hr/>
	452
	<hr/>

Goetghebuer's material is preserved in the Musée Royal du Congo Belge, Tervuren; there is type material of practically all my species in the British Museum (N. H.). Of the material examined by Kieffer, however, there seems to be little left. I have seen the types of nearly 90 species located in the British Museum, in the Museum National d'Histoire Naturelle, Paris, in the Hungarian National Museum, and in the South African Museum, Cape Town. The types of the remainder appear to be lost.

Kieffer wrote twelve papers between 1908 and 1925 either entirely on material from Africa south of the Sahara or containing descriptions of species from that Region. Some African species are to be found in Egypt and at least one in Palestine ; it is therefore necessary to study his papers on Egyptian material. His most important papers on the African fauna are the series of three under the title " Chironomides de l'Afrique Equatorial " (*Ann. Soc. ent. France*, 1921-3). In these he described 158 new species and 28 new genera. Despite the fact that Kieffer gave keys to both genera and species, Goetghebuer was able to recognize only three of his new genera and three of his species.

The material studied by Kieffer was almost all preserved in alcohol, whereas that available to Goetghebuer and myself is mostly pinned. Specimens preserved in spirit tend to be much paler than those that are pinned, the colours fade more easily and the pruinosity is invisible. This means that more attention has to be paid to the structural characters mentioned by Kieffer than to the colour characters. Although this might seem to be an advantage owing to the variability of colour characters, in fact it is not, because he often used head characters which are generic rather than specific and minute tarsal characters which are extremely difficult to see and to appreciate. Female Chironomids are notoriously difficult to identify, but Kieffer described 46 species from females devoid of wing markings or other distinctive features. These will probably never be recognized.

At the time of writing I have been able to recognize about 130 of Kieffer's species and about 12 of his genera based on African material. Nearly every collection sent to me contains at least one of his species which is new to me. The feature which I find most puzzling in his work is the abundance of species described by him and unknown to me with striking characters of wing and leg markings, and the absence in his papers of descriptions of species which to me are common.

Kieffer's work was very erratic. Some of his descriptions are accurate and render the species recognizable easily and with confidence. These are usually species with clear-cut markings or distinctive structural features which he has figured. If the markings are not clear-cut or are at all complex then they are difficult to interpret

from any description and a figure is essential. Unfortunately Kieffer did not figure wing or leg markings for any species.

Some of his hypopygial figures seem fairly accurate, but others do not inspire confidence and they may have been drawn from poor mounts. Most of his type specimens are lacking hypopygia, but in one instance (*Chironomus ornatipennis* Kieffer = *Polypedilum alticola* Kieffer) the hypopygium is present, mounted in ordinary gum on one of the data labels beneath the specimen. It is distorted and accounts for the figure (*Ann. Mus. nat. Hung.* 16 : 69) in which the styles as drawn are quite unlike those of a specimen with them properly expanded. I have remounted this hypopygium in balsam to show the correct appearance. If many of his drawings were made from mounts like this it will account for much of the difficulty in recognizing his species even when figures are given.

His concept of the genera was very uncertain. In 1914 he described *Polypedilum alticola*, placing it quite correctly into that genus, of which it is a large, well marked, typical species. However, in 1918, he again described it as a new species, but this time as *Chironomus ornatipennis*. In fact, of the six species placed in *Chironomus* in this later paper, examination of the types shows that only one really belongs to this genus in its strictest sense (as used by Kieffer): two belong to *Polypedilum*, one to *Nilodorum*, one to *Cryptochironomus* and one seems best placed in the genus which he later described as *Kribiomimus*. There are many other examples of errors of this type which help to make his work so difficult to interpret.

In addition, some species seem to have been described over and over again not only in different papers but even in the same one. Examples of this are afforded by *Pentaneura pictipes* which he seems to have described four times in the same paper and a fifth time in a later paper; and *Chironomus palustris* which he described later as *C. iricolor* and *Calochironomus oxylabis*.

To complete the recognition of Kieffer's species much more collecting in the type localities will be necessary. As proof of this, his 1921-3 papers contain descriptions of between 60 and 70 new species and 8 new genera from southern Anglo-Egyptian Sudan. This is an area from which I have much material and I have been able to recognize no less than 40 of these species and 7 of the genera. From this it can be inferred that further collecting in other areas will enable many more of his species to be found again (see further under "Biology and Distribution").

The big collections available to me have come from Anglo-Egyptian Sudan (Lewis and Reid), South Africa (Scott, Harrison and Brinck) and Belgian Congo, Parc National Albert. I have smaller collections from other parts of Africa, especially Uganda, Kenya, Gold Coast and Nigeria, but very few from the forested areas.

I hope that publication of this study will encourage entomologists in Africa to collect more Chironomidae, especially at light. Regular collections over a long period will probably add enormously to the knowledge of the family.

#### COLLECTING, PRESERVATION AND EXAMINATION

Chironomidae come readily to light, although I have no information as to whether this applies to all species or even equally to both sexes of the same species. Most

of the material available to Kieffer and much of that in the British Museum was taken at light. The males are also easily caught with a net in their mating swarms. Both sexes can be found on vegetation, etc., near water. Mating pairs can be obtained by watching the swarms until a female appears and mates with one of the males; the pair drops to the ground and can be captured.

Nearly all the material described by Kieffer and much that is collected at the present time is preserved in spirit. So far as I know, the only advantages of this method of preservation are ease of collecting and the ease of making a superficial examination of the male hypopygium. Preservation in spirit has the following disadvantages:

- (1). The colours fade and the specimens are always paler than in life.
- (2). The pruinosity is masked, and surfaces which are dull may appear shining.
- (3). Hairs, especially wing macrotrichia, fall off.
- (4). Wing veins become transparent and difficult to see.
- (5). Antennae and legs soon break off, especially if the specimens are sent through the post.
- (6). The specimens do not macerate well in 10% potash and become very transparent and difficult to handle.
- (7). Examination is not easy, as it is difficult to fix the specimens in any desired position.

On the other hand, dried specimens mounted either on the tips of stainless steel points or else stuck on small card triangles with gum or celluloid solution, have none of these disadvantages, although they are fragile and easily attacked by pests. In my opinion all material should be preserved dry because ease of examination and maceration combined with retention of colours, hairs, legs, etc., greatly outweigh such disadvantages as are inherent in dried collections.

Chironomids are very fragile and should not be left long in the killing bottle to shake about and break up; also large bodied insects should be kept away from them to avoid damage. When killed, they can be placed between layers of cellulose wadding for later mounting and examination, if it is not convenient to mount them immediately.

Most of the characters can be seen without slide mounting, but mounting is essential for male hypopygia and occasionally for wings or tarsal structures. I prefer to use Canada balsam after staining for about 10 minutes in a 1% solution of acid fuchsin in 20% alcohol. Where balsam is impracticable, "euparal" is probably equally effective. Gum-chloral media such as De Faur's mountant, are not good, as the shrinkage in drying invariably causes collapse of the hypopygia. I have no experience of polyvinyl alcohol media, but they are probably of no use with a water soluble stain such as acid fuchsin.

Mounts may be made on slides, but care must be taken that hypopygia are not crushed by the cover slip. I do not use slides for hypopygia but prefer to mount them in a drop of balsam placed on a strip of cover slip which is glued with celluloid solution to a small piece of card. No cover is used and the mount can be impaled through the card by the same pin that carries the specimen from which the hypopygium was taken. I find these mounts simple to make and easy to examine.



If necessary they can be remounted in different positions after dissolving the balsam in a mixture of xylol and absolute alcohol.

#### BIOLOGY AND DISTRIBUTION

Very little is known of the life histories of the African Chironomidae, but there seems to be no reason to assume that in general they will prove to be much different from the life histories of European species belonging to the same genera. So far as I know, detailed information is available only for the species *Polypedilum vanderplanki* Hinton, the larva of which has been shown by Hinton (1951, *Proc. zool. Soc. Lond.* **121** : 371-80) to be very resistant to desiccation. Larvae of this species can be dried for at least one and a half years after which time more than 90% of them can be reactivated by placing in water.

A notable feature of the African fauna is the comparative scarcity of the Orthocladiinae as compared with their abundance in individuals and species in the Palaearctic Region. Entomologists working with the Palaearctic fauna have found that the Orthocladiinae are especially typical of cold water habitats. This seems to apply also to the African fauna where some Orthocladiinae occur in the mountains of tropical Africa and at lower levels in the cooler climate of South Africa. For similar reasons the Diamesinae are represented by a single species and the Podominae not at all.

It is difficult to form any conclusions about the geographical distribution of the species on the basis of the relatively small amount of Chironomid material so far collected, but it does seem that many of the species are widely distributed. Edwards has noted in the British Chironomid fauna (1929, *Trans. ent. Soc. Lond.* **77** : 282), though of course the scale is quite different, that their distribution is governed by the distribution of water ecologically suited to each species rather than by other considerations.

In his 1921-3 papers on the Equatorial African Chironomid fauna, Kieffer described more than 150 species; 89 of these were from Kribi in the French Cameroons, 68 were from the southern Anglo-Egyptian Sudan and in each case about half the species were described from the female alone. I have identified more than 40 of the Sudanese species but less than a dozen of the Kribi species. A conclusion which may be drawn is that the collections at my disposal do not include enough species from the forested parts of Africa for me to identify the Kribi species. On the other hand, as Kribi is on the coast it may not be typical of the Guinean Forest proper.

In point of fact I have little material from the forested areas, the bulk of the collections available to me being from Anglo-Egyptian Sudan, East Africa and South Africa, with additional small collections from the Gold Coast, Nigeria and French West Africa. I have been singularly unsuccessful in my searches amongst this material for the species described by Kieffer from Kribi. The same thing is true of the collections studied by Goetgebuuer. He described over 80 species from the Belgian Congo, but only twelve or so of these came from the Guinean Forest; the remainder were from the higher eastern and southern parts of the Belgian Congo.

One of the species described by Kieffer from Kribi as *Kribiocosmus ornatipes* has

an interesting distribution. My material of it comes from the Gold Coast (Koforidua), French Sudan (Bamako) and the Belgian Congo (Stanleyville). The first two of these localities are right outside the Guinean Forest, which suggests that this species at least is not a forest one. If this applied generally to the Kribi species I would expect more of them to have been present in the collections available to me. As so few of the species are known to me, it seems quite probable that there is a fauna, fairly rich in species, associated with the Guinean Forest Province of the West African Zoogeographical Subregion, but which has not been collected to any extent since Kieffer wrote his 1921-3 papers.

Outside the Guinean Forest some species show a generalized Sudano-Zambesian distribution, being found in West Africa (Gold Coast, Nigeria), Anglo-Egyptian Sudan, East Africa, and South Africa. Examples of such species are :

*Pentaneura nilotica* Kieffer.  
*P. cygnus* Kieffer.  
*Clinotanypus claripennis* Kieffer.  
*Procladius albitalus* sp. nov.  
*Chironomus palustris* Kieffer.  
*Nilodorum brevibucca* Kieffer.

Species with a typical East African distribution from South Africa northwards to the Sudan include the following :

*Pentaneura trifascia* Freeman.  
*P. dusoleili* Goetghebuer.  
*Tanypus guttatipennis* Goetghebuer.  
*Procladius brevipetiolatus* Goetghebuer.  
*Chironomus sensualis* Kieffer.  
*C. albomarginatus* Kieffer.  
*Cryptochironomus subovatus* Freeman.  
*Polypedilum alticola* Kieffer.

The following species are known so far only from South Africa :

*Anatopynia marmorata* sp. nov.  
*A. unicolor* Freeman.  
*Chironomus caffrarius* Kieffer.  
*Microtendipes lamprogaster* Kieffer.

There is insufficient material available for me to go into greater detail at the present stage, because so many of the species are known only from one or two localities.

#### STRUCTURE

In this Section are described mainly the parts of the adult which are used in classification.

##### *Head.*

Although Kieffer often mentioned the shape of the head, I have rarely found it to be of value for separating species. It is generally wider than it is high. In the

subfamily Chironominae, just above the antennae, there may be a pair of small lobes known as the frontal tubercles (Text-fig. 1, c).

The eyes are large, sometimes (Orthoclaadiinae) reniform, sometimes with a long dorsal narrow portion. In some genera (e.g. *Clinotanypus*) there is a pronounced sexual difference in the eyes, those of the male having a long dorsal narrow portion,

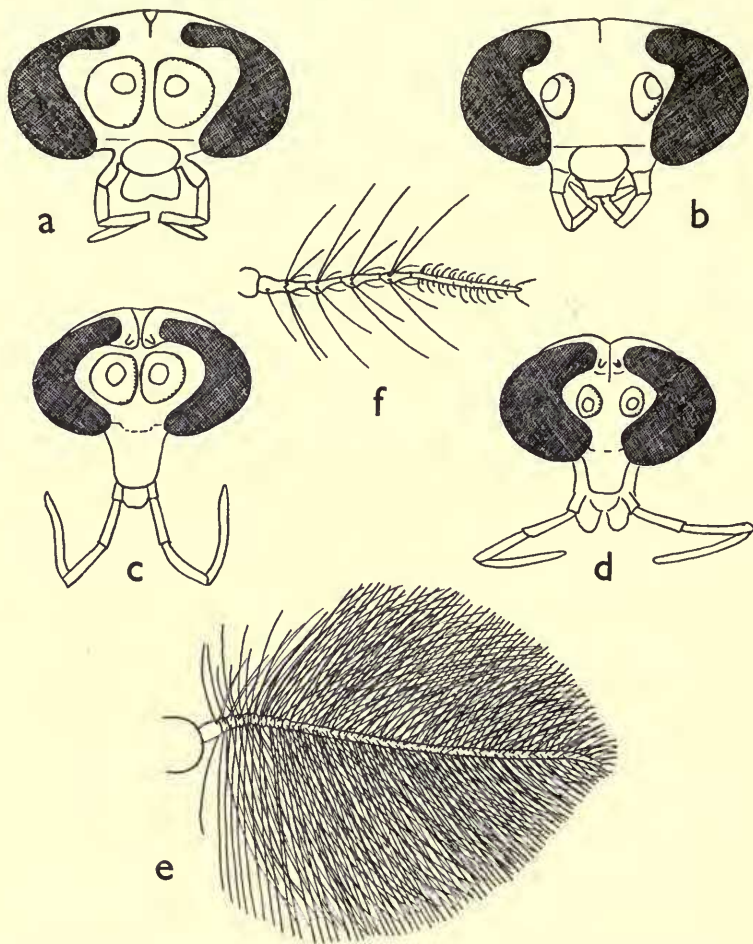


FIG. 1. Heads and antennae of Chironomidae. (a) *Clinotanypus niligenus* front view of male head ; (b) the same of female ; (c) *Chironomus bellus* Goetgh. front view of male head ; (d) the same of female ; (e) *Chironomus bellus* antenna of male ; (f) the same of female.

those of the female being more or less reniform (Text-figs. 1, a and b). There is usually some difference between the eyes of the two sexes of a species, those of the female often being larger and with a proportionately shorter and broader dorsal portion (Text-figs. 1, c and d). The eyes may be pubescent or bare, though this is more often a generic than a specific character.

As in allied families the true basal segment of the antennae is suppressed, the apparent basal one being really the pedicel or second segment. This in both sexes is enlarged (Text-fig. 1), greatly so in the male, and contains Johnston's organ.

The flagellum of the male antenna is strongly plumose and bushy (Text-fig. 1, e) except in a few aberrant species and in the subfamily Clunioninae. The maximum number of antennal segments, including the pedicel, is 15 (Tanypodinae). Segments 2-13 are quadrate or transverse, segment 14 is greatly elongate, segment 15 is much shorter and often only indistinctly separated from 14. In the Orthocladiinae and Chironominae the last two segments are fused, giving a total of 14, which in *Chironomus* and allied genera is reduced to 12 by further fusion of the basal segments to the long apical one. The ratio of the length of the last two segments (Tanypodinae) or last one (Chironominae) to the short basal segments taken together is termed the "antennal ratio" or A.R. Although it is variable the A.R. is of some use in specific diagnoses.

The antenna of the female is never plumose, and is shorter, often much shorter than in the male. In the Tanypodinae there may be as many as 15 segments including the pedicel; the segments are usually quadrate or moniliform, except for the last one which is enlarged and about three times as long as the penultimate. In some Tanypodine genera and species the number may be reduced to as few as 11. In the Orthocladiinae and Chironominae the segmentation of the female antenna is greatly reduced, six being the commonest number of segments (Text-fig. 1, f). In several genera there are seven segments and in others only five, fusion having taken place between segments 2 and 3 and between 6 and 7. In the six segmented species, fusion has taken place between segments 2 and 3 and it is sometimes difficult to be certain whether it is complete or not. The segments carry transparent curved sensory bristles sometimes used in classification. Segments 3-5 or 3-6 in those with seven segments are usually fusiform or "flask-shaped," that is, with a basal bulb and an apical neck. Each segment carries 4-6 long hairs in whorls.

The mouthparts are normal in appearance, though they are not large, as the insects rarely feed in the adult state. In some genera (e.g. *Nilodorum*) they are greatly reduced. The palpi are usually long and four segmented; I have not been able to find good specific characters in the lengths of the segments and there seems to be some variation even in those genera in which they are reduced.

### *Thorax.*

The prothorax is always reduced. In those genera which show it best developed, such as *Chironomus* or some Tanypodinae, it is collar-like and reaches up to the front of the mesonotum where it often has a V-shaped emargination. In the genera of the Chironominae there is a progressive reduction until in *Stenochironomus* and *Microtendipes* the mesonotum projects like a cone over, and almost in front of, the head.

The mesonotum carries three rows of bristles, the central double row being the acrostichal bristles and the sub-lateral ones the dorso-centrals. The central region of the posterior half of the mesonotum is somewhat sunken and flat and I have termed



it the "prescutellar area." The acrostichal bristles sometimes go straight across it, sometimes they part into two rows which run round it (Text-fig. 8, *a*). In some of the Tanypodine genera (e.g. *Tanypus*) there is an oval sharply defined tubercle just anterior to the prescutellar area. The scutellum is semicircular and carries a number of long hairs. Behind the scutellum is the postnotum with the longitudinal furrow characteristic of the family. This furrow is absent in the Podominae (no African species known to me) and greatly reduced in *Anatopynia unicolor* Freeman. There is a membranous area in the pleuron behind the anterior spiracle; the large, lower, ventro-lateral plate is the sternopleuron. The presence of the anepisternal suture is important in the separation of the Clunioninae (Text-fig. 15). This suture normally lies above the sternopleuron, separating it from the anepisternite.

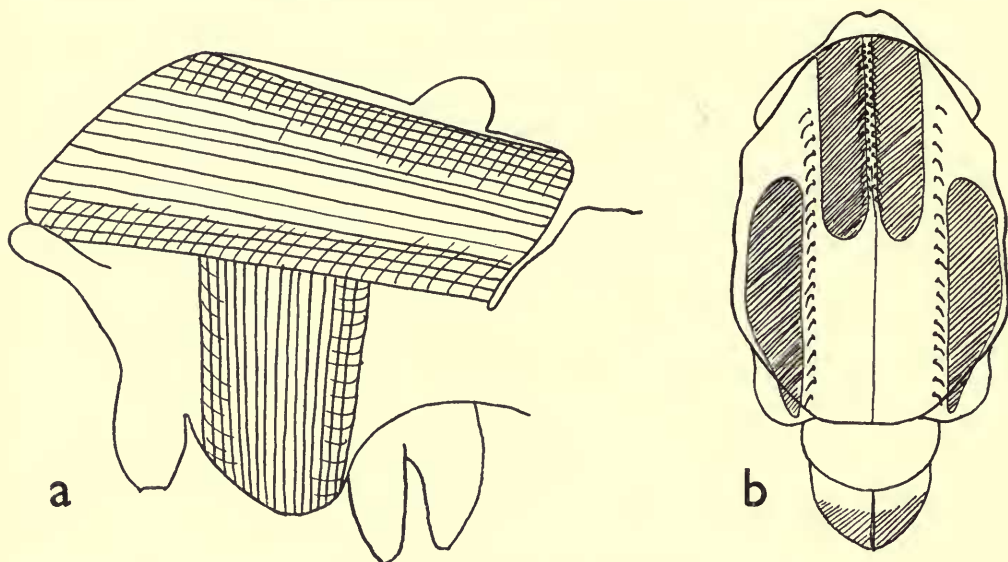


FIG. 2. Thorax of *Chironomus bellus* Goetgh. (*a*) semi-diagrammatic longitudinal section to show main flight muscles; (*b*) dorsal view to show insertions of muscles and rows of bristles.

The thorax has a standard pattern of darker markings which occurs throughout the family. These markings are on the cuticle over the insertions of the large flight muscles, which, as in other insects, are in two paired series, the longitudinal and the vertical.

The longitudinal muscles are in a median pair (Text-fig. 2, *a*) and run from the anterior half of the mesonotum to the postnotum, the posterior wall of which is vertical. These muscles are very deep. The prescutellar area, the scutellum and the basal half of the postnotum are not included in the attachment of these muscles and they are paler in colour. The acrostichal bristles are on the median line between the two longitudinal muscles and sometimes there is a narrow pale line here.

The vertical muscles are lateral to the longitudinal pair and run from the meso-



notum to the sternopleuron (Text-fig. 2, *a*). They are attached laterally to the posterior half of the mesonotum (Text-fig. 2, *b*) and run to the lowest part of the sternopleuron. The dorso-central bristles lie between the vertical and longitudinal muscles.

The darker areas are thus (Text-fig. 2, *b*) a pair (often fused) of anterior median and two postero-lateral mesonotal stripes, the apex of the postnotum and the lower part of the sternopleuron. These areas are nearly always of a different colour from the other parts which do not act as muscle attachments, namely, the shoulders, lines of dorso-central bristles, prescutellar area, scutellum, base of postnotum, and upper parts of pleura. In some very dark species most of the thorax is suffused with a dark colour, but it is usually possible to distinguish the areas of muscle attachment by their slightly darker colour.

The thorax is often pruinose and then the pruinosity is arranged differently on the two types of areas, so that the shoulders, lines of bristles and prescutellar area stand out from the areas of muscle attachment. A change in the direction of the light may reverse the colours, especially when the pruinosity is heavy.

### *Legs*

The legs are long and slender, especially the anterior pair. In the Tanypodinae and Orthocladiinae tibial spurs are present on all the tibiae and the anterior tibia is longer than the basitarsus. In the Chironominae the anterior tibial spur is usually either absent or else reduced in length and placed at the apex of an oval extension of the tibia termed the "scale." In this subfamily the anterior basitarsus is longer than the tibia, often much longer, also the apices of the posterior four tibiae are more complex and carry a pair of combs formed from a series of basally fused spinules. These combs are associated with the spurs, which appear to arise from their inner aspects. The presence or absence of the spurs and the fusion or otherwise of the combs are important in generic diagnosis. The ratio of anterior basitarsus to anterior tibia is useful in specific separation and is termed the "leg ratio" or L.R.

The anterior tarsi of the male may carry a fringe of long hairs, termed a beard. This is usually a specific character, but in the female it is either completely absent or else so reduced as not to be noticeable.

The fifth tarsal segment may carry a pair of pulvilli and an empodium below and between the claws. The development of the pulvilli varies throughout the family; they are largest in *Chironomus*. In *Polypedilum* and *Pentapedilum* each pulvillus is split longitudinally so that, with the empodium, there are five narrow lobes between the claws.

### *Wings*

The wings of the male are narrower than those of the female, but there is quite often a prominence in the anal lobe, especially in the Orthocladiinae, which is not present in the female. The presence of a fringe of setae on the basal squama is sometimes of taxonomic importance.

The wing membrane may carry both macrotrichia and microtrichia. The presence of the former is of importance generically throughout the family ; the size of the latter is used in the Orthocladiinae to separate some of the more difficult groups, but it is a difficult character to use and necessitates a  $\frac{1}{6}$  in. objective. In the females the hairs of both types are much better developed than in the males.

Many species have dark markings on the wings. Edwards has given four kinds of markings (1929, *Trans. ent. Soc. Lond.* 77 : 284), but I cannot say that I agree

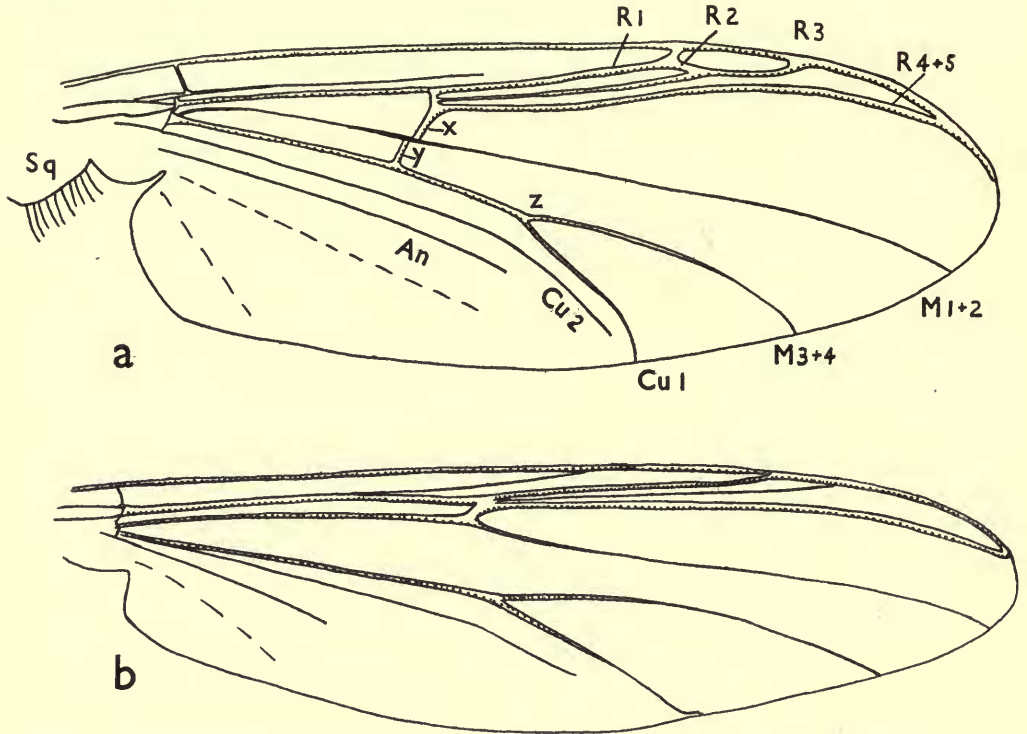


FIG. 3. Wings of Chironomidae. (a) *Procladius brevipetiolatus* female ; (b) *Chironomus cafferarius* Kieff. female. x, r-m cross-vein ; y, true base of  $M_{3+4}$  ; z, posterior fork ; Sq, squama and fringe.

completely with his views. In my opinion there appear to be three ways in which the markings are caused :

(1) By patches of dark or dark and light macrotrichia (especially *Anatopynia* and *Pentaneura*).

(2) By areas of greater concentration and darkening of microtrichia (e.g. *Tanypus*, *Dicrotendipes*, *Polypedilum*).

(3) By actual staining of the membrane (e.g. *Clinotanypus*, *Chironomus palustris*).

The dark areas caused by (1) and (2) are usually stained as well, at least slightly. The dark areas caused by the microtrichia are much more definite than those caused by staining alone, which produces a much more suffused effect. Dark

patches of macrotrichia are easily rubbed off, but their position is usually marked by a very light staining of the membrane which can be seen best by reflected daylight.

Examination of the wing markings, however caused, is best carried out by daylight using a binocular microscope, but, as Edwards says, the structural colours due to microtrichia are also visible by transmitted light when the wing is mounted in a liquid medium. This enables photographs to be made easily of this type of marking.

The wing of *Procladius brevipetiolatus* Goetgh. is shown in Text-fig. 3, *a* to illustrate one of the more primitive types of venation. I am adopting the Comstock and Needham system of notation of the veins as modified by Tillyard. Edwards and Goetghebuer did not use Tillyard's modification; to them the posterior fork was simply the cubital fork composed of  $Cu_1$  and  $Cu_2$ . Tillyard has shown, however that this is not so but that the anterior branch is really  $M_{3+4}$  which has become joined to  $Cu$ . The posterior branch is the true  $Cu_1$ , and  $Cu_2$  is reduced to a fold behind  $Cu_1$ . In *Procladius* the apparent cross-vein known to Edwards as m-cu is now correctly to be called the base of  $M_{3+4}$ .

In the wings of *Pentaneura* (Text-figs. 5, 7, 9) it will be seen that the true m-cu is present as the extreme basal portion of the anterior branch of the posterior fork. In *Coelotanypus* (Text-fig. 12, *a*)  $M_{3+4}$  only just touches  $Cu_1$ , so that m-cu is obliterated. For convenience in the descriptions I have referred to the  $M_{3+4}$ - $Cu_1$  fork as the "posterior fork"; the short vein known to Edwards as the "m-cu cross-vein," I now term the "base of  $M_{3+4}$ ." In the subfamilies Orthocladiinae, Corynoneurinae, Clunioninae and Chironominae the base of  $M_{3+4}$  is not developed (Text-fig. 3, *b*).

The veins of the radial field of Diptera have been interpreted by Alexander (1928, *IV Internat. Congr. Ent. Ithaca*, 11: 700-707), and to some extent the conformation of  $R_{2+3}$  in the Tanypodinae agrees with his interpretation. However, the venation is so specialized that I prefer to keep the older notation with  $R_{2+3}$  a forked vein in the Tanypodinae and a simple vein in the other subfamilies.

The vein  $M_{1+2}$  is simple in all Chironomidae and is connected to the radial sector by the cross-vein r-m. There is very often a dark spot or cloud over the cross-vein. The condition of the costa, whether or not it is extended or "produced" beyond the apex of  $R_{4+5}$  is important for specific and generic diagnosis.

### Abdomen

Except for the male hypopygium there are few features of systematic importance in the structure of the abdomen, although the arrangement of spots and bands is often helpful, especially in the male. There is sexual difference in the appearance of the abdomen; in the male it is slender, often with well developed markings; in the female it is stouter and darker and the markings are much less well developed.

The male hypopygium (Text-fig. 4) consists essentially of a pair of two segmented claspers, the basal segment being the coxite and the apical the style. In some of the Tanypodinae there is very little else than this, except that the style has an apical spine and the coxite a few hairs on the inner surface. Internally, associated with the junction of IXth segment and coxite there are a pair of struts which fuse in the mid-line and another pair lying more or less transversely (Text-fig. 4, *a*, *c*); these struts show greater development in the Corynoneurinae.

In all the subfamilies except the Chironominae, the styles can bend forwards and lie against the inner aspects of the coxites (Text-fig. 4, *a*) ; they carry an apical spine and sometimes a longitudinal flange. In the Chironominae (Text-fig. 4, *c, d*) the styles project rigidly backwards and do not carry apical spines, but there is often a row of long setae internally near the apex.

The coxites carry lobes or appendages on their inner aspects, one or two in the Orthoclaadiinae (Text-fig. 4, *a*), as many as four in some genera of the Chironominae. Whether the lobes of the Orthoclaadiinae are homologous with the appendages of the Chironominae is not clear, but they arise in more or less the same positions. In the Chironominae there is an upper, often hook-like, appendage 1 and a lower, usually larger, more hairy, appendage 2 (Text-fig. 4, *c, d*) : each may have a subsidiary appendage termed 1a and 2a respectively (especially in *Tanytarsus*).

The ninth tergite usually carries an "anal point" (Text-fig. 4) its length, hairiness and position being important. The anal point is not developed in the Tanypodinae and it is absent spasmodically throughout the family. The ninth sternite is narrow and band-like. The tenth segment is largely membranous, but occupies quite a large area in the Orthoclaadiinae (Text-fig. 4, *a*).

In *Pentaneura* subgenus *Ablabesmyia* there are aedeagal structures (Text-fig. 10) between the coxites. These are erectile and can be only studied properly when they are everted, a condition not often seen. I have had no success with artificially everting them after death. This is a pity because there appear to be good specific differences in these structures.

The spermathecae have hardly been mentioned in the literature and Edwards (1937, *Ann. Mag. nat. Hist.* (10) 20:141) casts doubt on their existence as sclerotised structures, at any rate in Orthoclaadiine genera other than *Abiskomyia* and *Symbiocladius*. I have taken this opportunity of examining the spermathecae of representatives of the following genera: *Pentaneura*, *Procladius*, *Podonomus*, *Protanypus*, *Diamesa*, *Metriocnemus*, *Cardiocladius*, *Cricotopus*, *Abiskomyia*, *Psectrocladius*, *Orthocladus*, *Pseudochironomus*, *Chironomus*, *Cryptochironomus*, and *Poly-pedilum*.

In the Tanypodine genera and in *Protanypus* the spermathecae are three in number, spherical or oval and well sclerotised; in a new Orthoclaadiine genus to be described later there are three bell-shaped ones. In the other Diamesine, Podomine and Orthoclaadiine genera except *Cardiocladius*, the spermathecae are two in number, spherical and sclerotised. In the Chironominae and in *Cardiocladius* they are again two in number and spherical, but here they are colourless and quite unsclerotised. It seems then that these organs are subject to a progressive reduction throughout the family, although a much more extensive study is necessary to form any detailed conclusions.

#### VARIATION AND DIFFERENCES BETWEEN THE SEXES

There is a good deal of variation within a species in colour, in the leg and antennal ratios and in hairiness. The mesonotal stripes are the parts most noticeably affected by colour variation, both in shade and also in the degree of fusion in dark species.



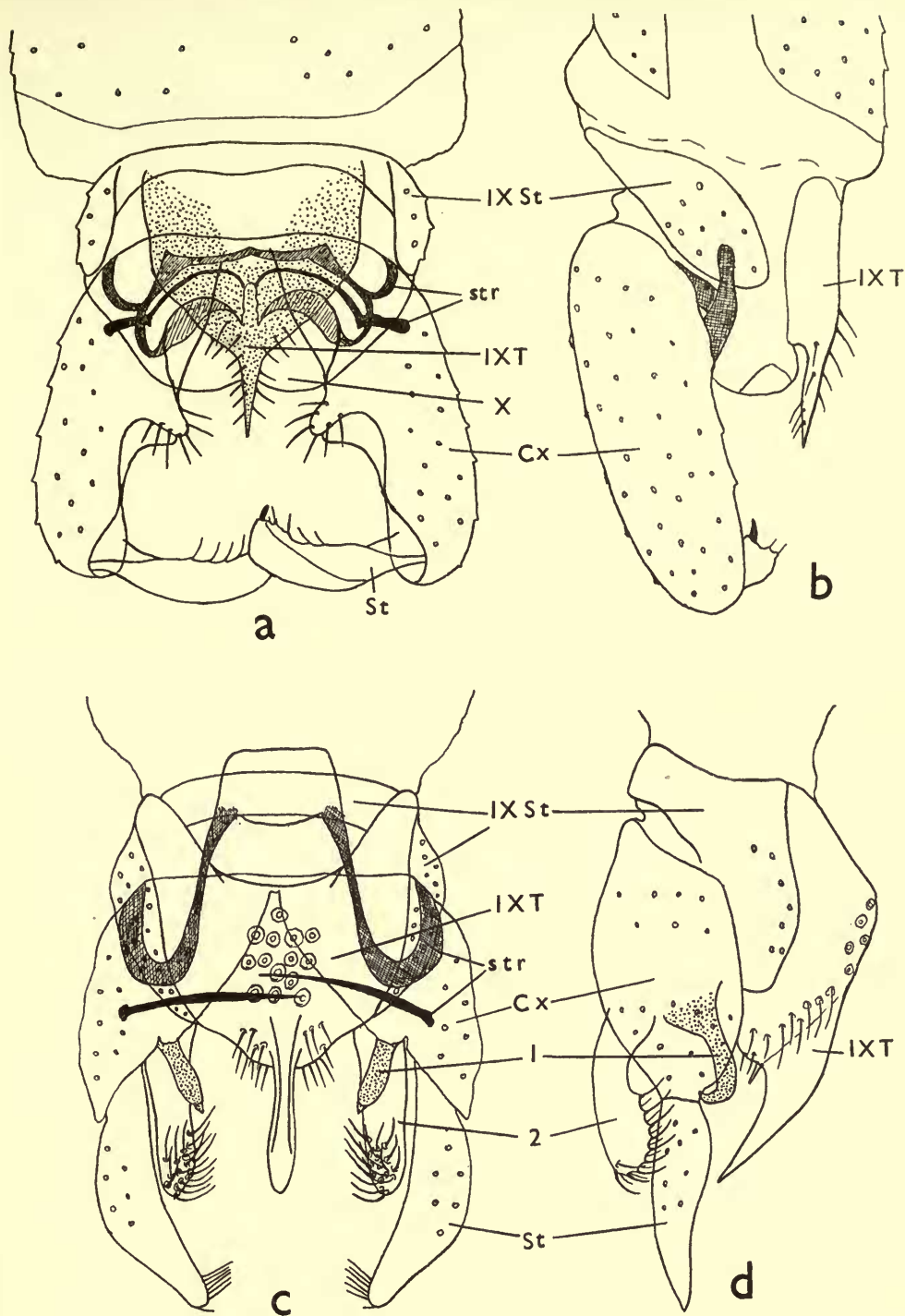


FIG. 4. Male hypopygia of Chironomidae. (a) *Orthocladius bergensis* Freeman in dorsal aspect; (b) the same in lateral aspect; (c) *Chironomus cafferarius* Kieffer in dorsal aspect; (d) the same in lateral aspect. Cx, coxite; St, style; str, struts; 1, coxite appendage 1; 2, coxite appendage 2; IXSt, ninth sternite; IXT, ninth tergite and anal point; X, tenth segment.

The wing markings, when present, are also liable to vary. Townes (1945, *Amer. Midl. Nat.* **34**: 6) states that specimens developing at lower temperatures have more dark pigment than those developing at a higher temperature. The African species seem to agree with this.

There is considerable difference in appearance between the two sexes. The greatest differences are in the antennae and the abdomen. In the male the antennae are almost always plumed and the ultimate or penultimate segment very long; also the pedicel is greatly enlarged. In the female the antennae are reduced in length and segmentation, except in the Tanypodinae and the plumes are not developed; the pedicel is smaller than in the male. On the other hand, the eyes of the female tend to be bulkier than in the male. The male abdomen is slender, with the hypopygium at the end, and it often carries markings. In the female the abdomen is bulkier, lacks the hypopygium and tends to be unicolorous. Other differences lie in the wider female wings and absence in that sex of a tarsal beard even when present in the male. However, when macrotrichia are present on the wings, they are much better developed in the female.

Thoracic and leg structure and pattern, wing venation and pattern are usually rather similar in both sexes. The colour pattern may be more clearly defined in the female, the darker markings being more definite.

Intersexes caused by parasitism by a Nematode worm of the family Mermithidae are often found. Rempel (1940, *Journ. Exp. Biol.* **84**: 261-87) has dealt with the subject in detail. He finds that it is the female larvae which are attacked, males are seldom infested and if they are, do not become intersexes. The Nematode larva feeds on the developing ovaries and gluten gland which induces in the host the development of male sexual characters, resulting in an intersex.

A typical intersex looks like a female with normal male hypopygium and there is a varying amount of male internal structure regenerated. The insect behaves as a female, mating with a male and making "egg laying" flights over the water.

The genus *Gillotia* Kieffer was described from such a specimen. A normal male is seen to belong to the genus *Cryptochironomus*.

#### KEY TO SUBFAMILIES OF CHIRONOMIDAE

1. Base of  $M_{3+4}$  present . . . . . 2  
    Base of  $M_{3+4}$  absent . . . . . 4
2. Postnotum lacking median furrow;  $R_{2+3}$  completely absent, although  $R_1$  and  $R_{4+5}$  are well separated . . . . . *PODOMINAE*  
    Postnotal furrow well developed except in one species and in this  $R_{2+3}$  is well developed;  $R_{2+3}$  present . . . . . 3
3.  $R_{2+3}$  forked (e.g. Text-fig. 5) (in some small species of *Pentaneura*  $R_{2+3}$  is crowded out by close approximation of  $R_1$  and  $R_{4+5}$ , but in these species wings very hairy) . . . . . *TANYPODINAE*  
     $R_{2+3}$  simple (Pl. I, fig. m) and always distinct, wings usually bare . . . . . *DIAMESINAE*
4. L.R. less than 1; front tibia with spur; tibial combs not composed of short basally fused spinules; male styles folded inwards . . . . . 5  
    L.R. nearly always more than 1; front tibial spur reduced, except in *Pseudochironomus* (no African species described); tibial combs composed of short basally fused spinules in nearly all genera; male styles always directed rigidly backwards . . . . . *CHIRONOMINAE*

5.  $R_{4+5}$  completely fused with the thickened costa to form a "clavus" and with a false vein running close to anterior margin on outer half of wing . . . . . CORYNONEURINAE  
 $R_{4+5}$  not fused with the thickened costa . . . . . 6
6. Pronotum scarcely divided; anepisternal suture well developed (Text-fig. 15); male antenna normally plumose . . . . . ORTHOCLADIINAE  
 Pronotal lobes widely separated; anepisternal suture obsolete (Text-fig. 15); male antenna not plumose . . . . . CLUNIONINAE

### Subfamily *PODOMINAE*

There are no species of this subfamily either recorded or known to me from Africa south of the Sahara. Species are recorded from or known to occur in the Holarctic Region, Chilean Sub-region, South Georgia and New Zealand and it is quite likely that some may be found in South Africa or in the mountainous parts of Central and East Africa. The subfamily is included here for the sake of completeness.

The Podominae can be separated from the Tanypodinae because (1)  $R_{2+3}$  is completely absent even though  $R_1$  and  $R_{4+5}$  are well separated; (2) the postnotum is short and evenly rounded and has no trace of the median furrow; (3) at rest the wings are superposed over the back as in the Ceratopogonidae.

#### KEY TO GENERA OF *PODOMINAE*

1. Costa ending at tip of  $R_{4+5}$  . . . . . *Parochlus* Enderlein  
 Costa produced well beyond tip of  $R_{4+5}$  . . . . . 2
2. Base of  $M_{3+4}$  basal to posterior fork . . . . . 3  
 Base of  $M_{3+4}$  distal to or opposite posterior fork . . . . . 4
3. Pulvilli large, eyes pubescent . . . . . *Trichotanypus* Kieffer  
 Pulvilli absent, eyes bare . . . . . *Boreochlus* Edwards
4. Hind tibia without a definite comb on the inner side at tip, both spurs long;  $R_1$  long and slender in both sexes; female antenna with 15 segments *Lasiodiamesa* Kieffer  
 Hind tibial comb present, one spur short;  $R_1$  more or less swollen apically in the female; female antenna with 8-12 segments . . . . . *Podonomus* Philippi

### Subfamily *TANYPODINAE*

The Tanypodinae differ from the other subfamilies by the retention of vein  $R_2$ , though in some small species of *Pentaneura* the whole vein  $R_{2+3}$  may become crowded out by the close approximation of veins  $R_1$  and  $R_{4+5}$ . Other primitive characters lie in the presence of the base of  $M_{3+4}$  and in the segmentation of the antennae. In the male there are 15 antennal segments, the fifteenth being formed at the apex of the greatly elongated fourteenth. In the female the maximum number of 15 segments is developed in *Anatopynia* and some species of *Tanypus*, the lowest number for the African fauna is 11 in *Pentaneura pictipes* Kieffer. The male hypopygium usually has no basal coxite lobes or appendages, although in some species of *Pentaneura* aedeagal appendages are present. The larvae are carnivorous, feeding mostly on other Chironomid larvae.

The subfamily is well represented in Africa south of the Sahara, most genera and species groups being present. The species of *Coelotanypus* and *Clinotanypus* suggest that these two genera are only doubtfully distinct, and there is a tendency for

some of the other genera to run together. There are no new genera in the material at my disposal and practically all the species fit into species groups known from the Palaearctic Region. The species of *Anatopynia* seem to be more or less confined to the mountainous regions and to the Cape, otherwise the species of the subfamily are fairly well distributed over the Region.

#### KEY TO GENERA OF TANYPODINAE

1. Fourth segment of tarsus cordiform; wing membrane without macrotrichia . . . . . 2  
 All tarsal segments cylindrical; macrotrichia present on wing membrane, except in *Procladius* subg. *Psilotanypus* . . . . . 3
2. Posterior fork stalked, mesonotum with central oval tubercle in one species only *Clinotanypus* Kieffer  
 Posterior fork sessile (i.e. opposite free base of  $M_{3+4}$ ); mesonotum always with central oval tubercle . . . . . *Coelotanypus* Kieffer
3. Posterior fork stalked . . . . . 4  
 Posterior fork basal to free base of  $M_{3+4}$  . . . . . 5
4. Central mesonotal tubercle present, stem of posterior fork less than one third as long as  $Cu_1$  . . . . . *Tanypus* Meigen  
 Tubercle absent, stem of fork about half as long as  $Cu_1$  . . . . . *Procladius* Skuse
5. Female antennae with 11–13 segments; costa normally not produced, smaller species *Pentaneura* Philippi  
 Female antennae with 15 segments; costa always distinctly produced beyond the apex of  $R_{4+5}$  . . . . . *Anatopynia* Johannsen

#### Genus *PENTANEURA* Philippi

- Pentaneura* Philippi, 1865, *Verh. Zool.-bot. Ges. Wien.* **15**, 629; Edwards, 1929, *Trans. ent. Soc. Lond.* **77**: 287; Johannsen, 1946, *Journ. New York ent. Soc.* **54**: 267–89; Freeman, 1953, *Proc. R. ent. Soc. Lond. (B)* **22**: 127.
- Isoplastus* Skuse, 1889, *Proc. Linn. Soc. N.S. Wales* (2) **4**: 279 (nec *Isoplastus* Horn, 1880, *Trans. Amer. ent. Soc.* **8**: 277, 295—Coleoptera); Kieffer, 1911, *Trans. Linn. Soc. Lond.* **14**: 364.
- Abalabesmyia* Johannsen, 1905, *Bul. N. Y. St. Mus.* **86**: 135; Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* **27**: 356.
- Nilotanypus* Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 191.
- Tanypus* (Meigen) Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 192.
- Psectrotanypus* Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 202 (nec Kieffer, 1909, *Bull. Soc. Metz* **26**: 42).

As stated in my 1953 paper I am following Edwards in the use of *Pentaneura* for this genus. The following definition is taken from Edwards:

Wings densely hairy. Costa not or only very indistinctly produced;  $R_2$  normally present; base of  $M_{3+4}$  placed immediately beyond the posterior fork. Antennae of female with 11–13 segments. Pronotum more reduced than in other genera of the subfamily. No tarsal spurs. Pulvilli usually absent.

Although this definition fits most species, one or two of the African species have the costa produced and in some the prothorax is not much smaller than in *Anatopynia*. This makes the two genera really only separable on the number of segments in the female antennae. However, it is desirable to keep the two genera separate because the larvae and pupae of *Pentaneura* differ from those of the rest of the subfamily, whilst those of *Anatopynia* tend to resemble the rest of the subfamily.



Edwards divided the British species of *Pentaneura* into six groups and Johannsen has done the same with the North American species. Some of these groups seem to be very artificial when applied to the African fauna. I have found that the African species fall easily into two groups, which may well prove later to be of full generic status, though I am leaving them as subgenera until both sexes of *P. annulator* Goetgh. can be examined, as this species is to some extent intermediate. In all species of both groups the wings are densely clothed with macrotrichia and there is often a pattern formed by areas of light and dark macrotrichia.

#### KEY TO SUBGENERA OF *Pentaneura*

Tibiae without black rings, at the most there are brown markings above and below the knees; prescutellar area not well defined, acrostichal bristles running across it; male hypopygium usually without basal aedeagal structures, spine of style apical

*Pentaneura* Philippi

Tibiae with three or four well defined black rings (Text-fig. 8); prescutellar area sharply defined, more or less circular, acrostichal bristles diverging around it; male hypopygium always with complex aedeagal structures, spine of style subapical (Text-fig. 10)

*Ablabesmyia* Johannsen (*Isoplastus* Skuse)

#### *Pentaneura* PHILIPPI SUBGENUS *Pentaneura* SENSU STRICTO

*Pentaneura* Philippi, 1865; Edwards, 1929 (Groups B-F); Johannsen, 1946 (Groups B-F); Freeman, 1953 (in part).

*Isoplastus* Kieffer, 1911.

*Ablabesmyia* Johannsen, 1905 (in part); Goetghebuer, 1935 (in part).

*Nilotanypus* Kieffer, 1923.

*Psectrotanypus* Kieffer, 1923.

This subgenus includes *Nilotanypus* because of the connecting Palaearctic species *P. longipalpis* Goetghebuer. This is unfortunate because typical *Nilotanypus* species are easily recognized by their pubescent eyes and retracted costa, and might otherwise be separated off as a distinct genus.

Most of the species have simple coxites in the male, but in a few species there are spiny lobes carried basally on the coxites; none of the species known to me has the complex structures found in the subgenus *Ablabesmyia*. The other characters of the subgenus are given in the key above. All the small, pallid, unicolorous species belong here, and there are no doubt many more species to be discovered in Africa. Some of the species are much larger and markings on the wings are common. It is of interest to note that Kieffer only described one species belonging to this subgenus against more than a dozen belonging to the other subgenus, although the total number of species in *Pentaneura* is much greater than in *Ablabesmyia*.

#### KEY TO AFRICAN SPECIES OF *Pentaneura* SENS. STR.

1. Tarsi with wide black rings in middle of basitarsus and at base of second segment, segments 3-5 black . . . . . *annulator* Goetghebuer
- Tarsi without rings . . . . . 2
2. Small species (wing length 0.75-1.4 mm.) with retracted costa (Text-fig. 7, d) and often hairy eyes . . . . . 3
- Costa longer, ending beyond level of  $M_{3+4}$ , eyes always bare . . . . . 5

3. Eyes bare . . . . . *minimus* Kieffer and *micra* sp. n.  
 Eyes hairy . . . . . 4
4. Macrotrichia covering wing densely . . . . . *comata* Freeman  
 Macrotrichia confined to apex of wing in male and sparsely arranged in female  
*remotissima* Kieffer
5. Legs darkened at knees or at any rate femora with subapical brown ring, wings  
 with markings . . . . . 6  
 Legs quite plain . . . . . 9
6. Wing membrane deeply stained beneath spot in middle of cell  $R_5$  (Text-fig. 5, c)  
*tinctoria* sp. n.  
 Wing membrane only very lightly stained beneath the spots . . . . . 7
7. Small species (wing length 1.3 mm.) with black knees, wing markings as in Text-fig.  
 5, d . . . . . *teesdalei* sp. n.  
 Larger species (wing length 1.8–3.8 mm.), femora with subapical ring . . . . . 8
8. Wing pattern as in Text-fig. 5, a, with a broad fascia; male hypopygial basal ap-  
 pendages with lateral basal processes (Text-fig. 6, a) . . . . . *cygnus* Kieffer  
 Wing pattern as in Text-fig. 5, b, fascia narrower, obvious apical markings present;  
 male hypopygial appendages simple (Text-fig. 6, b) . . . . . *trifascia* Freeman
9. Wings with dark markings . . . . . 10  
 Wings quite plain, unmarked even at the cross-vein . . . . . 13
10. Wing markings confined to a small cloud over cross-vein . . . . . *rutshuruiensis* Goetghebuer  
 Wing markings more extensive . . . . . 11
11. Wings with faint transverse grey band and grey at apex . . . . . *interrupta* Goetghebuer  
 Wings with markings different from these . . . . . 12
12. Wings darker with pale markings (Text-fig. 5, e, f) . . . . . 12a  
 Wings light with dark markings (Text-fig. 5, g) . . . . . *octomaculata* Freeman
- 12a. Cell  $M_1$  with only one pale area . . . . . *nigromarmorata* Goetghebuer  
 Cell  $M_1$  with two pale areas . . . . . *septemguttata* sp. n.
13. Wing length over 3.0 mm. . . . . 14  
 Wing length less than 3.0 mm. . . . . 15
14.  $R_{4+5}$  ending before level of  $M_{1+2}$  (Text-fig. 7, a) . . . . . *edwardsi* sp. n.  
 $R_{4+5}$  ending beyond level of  $M_{1+2}$  (Text-fig. 7, b) . . . . . *longinervis* sp. n.
15. Hairs on posterior tibiae of male very long, sometimes one third length of tibia;  
 shoulders strongly pruinose . . . . . *hirsuta* sp. n.  
 Hairs on posterior tibiae of male normal; shoulders not strongly pruinose . . . . . 16
16. Wing hairs dark and dense; palpi of female as long as antennae . . . . . *palpalis* Goetghebuer  
 Wing hairs light brown, palpi not noticeably longer than usual . . . . . 17
17. Costa strongly produced . . . . . 18  
 Costa not produced . . . . . 19
18. Yellowish species, though thorax may have reddish stripes  
*pallidissima* Kieffer and *uniformis* Goetghebuer  
 Species with dark brown pruinose thorax, abdomen also dark . . . . . *aurantiaca* Kieffer
19. Middle and posterior tibiae one and a half times length of femora; segment 4 of  
 male abdomen mainly pale; wing hairs dense . . . . . *longipes* sp. n.  
 Middle tibiae hardly longer than femora; segment 4 of male abdomen with pale  
 apical band only; wing hairs normal . . . . . *meillonii* sp. n.

### *Pentaneura (Pentaneura) annulator* Goetghebuer

*Ablabesmyia annulator* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27: 357.

I have seen no specimens of this species, but it should be easily recognizable because of the presence of black rings on at least the anterior tarsi, and at the apices of the tibiae—the other tarsi are broken in the only specimen known; the wings have

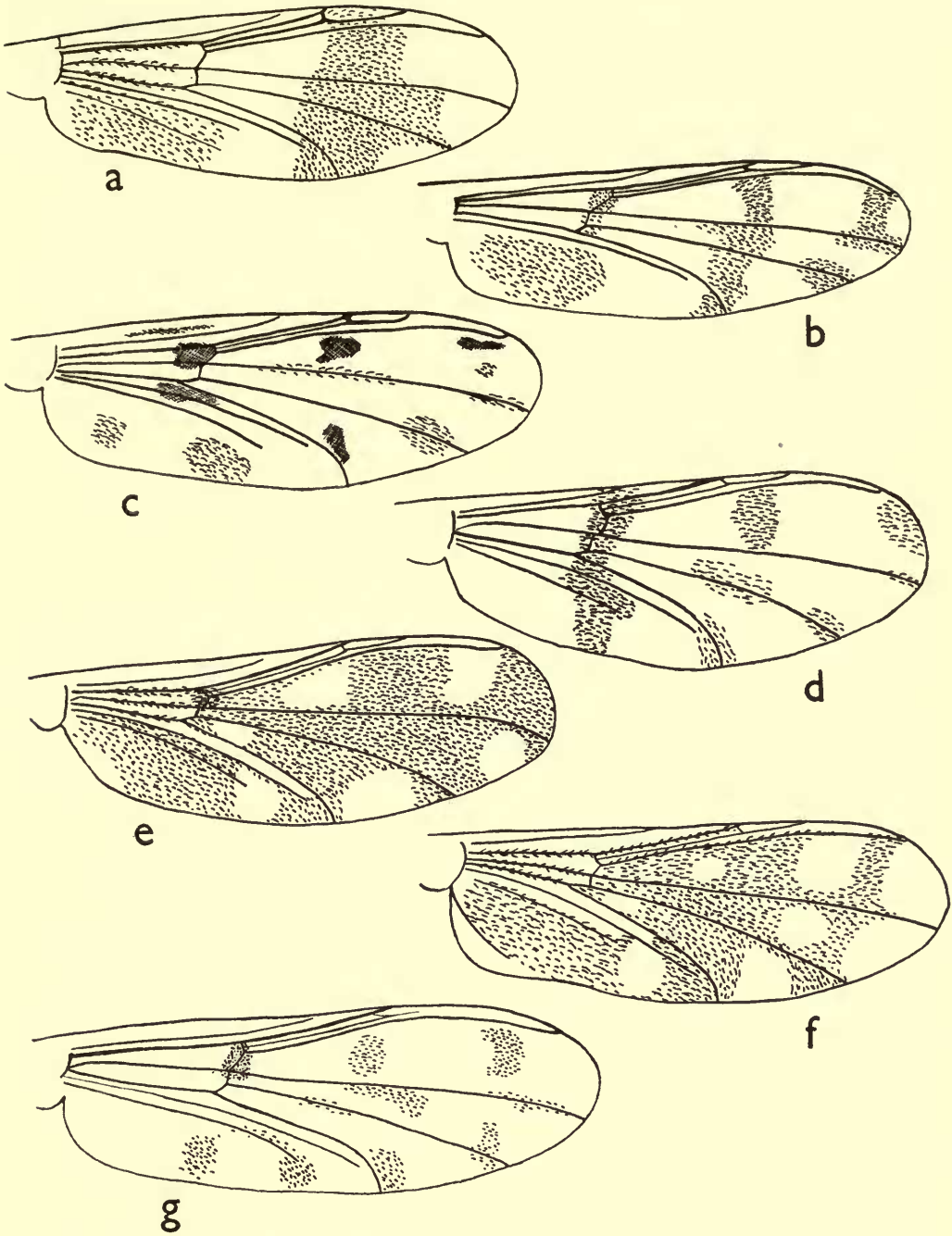


FIG. 5. Wings of *Pentaneura* sens. str., females, only areas of dark macrotrichia shown. (a) *P. cygnus*; (b) *P. trifascia*; (c) *P. tinctoria*; (d) *P. teesdalei*; (e) *P. nigromarmorata*; (f) *P. septemguttata*; (g) *P. octomaculata*.

nebulous spots, probably white on a dark background. It would be interesting to study a male and the prescutellar area to see whether it truly belongs to this subgenus. The following description is translated from the original description.

*Female.* Length 2 mm.

Mesonotum yellowish grey with abundant yellowish pubescence, scutellum yellow, sternopleuron brown black, postnotum black, abdomen black with yellow pubescence; femora grey, extremity whitish; tibiae white with the extremity black; anterior basitarsus white with a central black ring (the figure also shows a narrow black apex); second tarsal segment white, basally black; segments 3-5 black; halteres greyish. Antennae 12-segmented, 3-11 ovoid, the last as long as the two preceding together. Anterior tibiae hardly longer than the basitarsus, posterior tarsi broken, posterior legs with long hairs. Wings very hairy, macrotrichia black, with nebulous spots, of which one large spot is in the second half of the wing in cells  $R_5$ ,  $M_{1+2}$  and  $M_{3+4}$ , other spots are in the basal half; r-m black; costa not produced.

Type locality, BELGIAN CONGO: Escarpement Kabasha, Chambi.

### *Pentaneura (Pentaneura) cygnus* Kieffer

*Psectrotanypus cygnus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 203.

This species is readily recognizable by the structure of the male hypopygium, which agrees quite closely with Kieffer's figure. This and the following species belong to a small group which includes some Palaearctic and Nearctic species (e.g. *pallidula* Meigen and *flavifrons* Johannsen) and which is characterized by the presence of paired hairy or spiny processes between the coxites and by the stout curved styles, slightly swollen near the apex. In *cygnus* the hairy processes are produced laterally at their bases; in addition it is a much paler insect than *trifascia* the thoracic background is whiter and the wing markings are different.

*Male.* Wing length 1.8-2.2 mm.

*Head* and mouthparts pale yellow, antennae and face brown; A.R. about 1.5. *Thorax* with whitish background especially on shoulders and prescutellar area; mesonotal stripes, postnotum and sternopleuron yellowish brown, stripes more or less fused, hairs pale. *Legs* quite pale, femora slightly darkened subapically, tibial hairs moderately long. *Wings* with pattern of dark macrotrichia as shown in Text-fig. 5, *a*; in some specimens there is an additional area of dark hairs at the apex of cell  $R_5$ . Halteres white. *Abdomen* white, segments 2-5 with brown basal rings and a brown median area in the basal half which is not always well marked, segments 6-8 with only the apices white, hypopygium white. Hypopygial structure as in Text-fig. 6, *a*, basal spiny processes produced laterally at their bases, style rather swollen near the apex.

*Female.* Very similar to male in colour and pattern; abdomen whitish, each segment brown at the base.

I have seen no type material; type locality, ANGLO-EGYPTIAN SUDAN: Shambe.

DISTRIBUTION. ANGLO-EGYPTIAN SUDAN: 1 ♂, Khartoum, x.1951 and 4 ♂,



Wad Medani, ii.1952 (*D. J. Lewis*); 5♂, 12 ♀, at light on Nile steamer between Melut and Shambe, 17-22.xi.53 (*E. T. M. Reid*). GOLD COAST: 1 ♀, Kpong, iv.1922 (*J. W. S. Macfie*); 3 ♂, 3 ♀, Red Volta, Bolgatanga, xi.54 (*G. Crisp*). KENYA: 1 ♂ in aeroplane flying from Juba-Kisumu, 3.vi.35 (*C. B. Symes*). BELGIAN CONGO: 2 ♂, 5 ♀, Elisabethville, xii.38 (*H. Brédo*). NATAL: 1 ♂, Tugela River, Colenso, 14-30.ix.53 (*A. D. Harrison*).

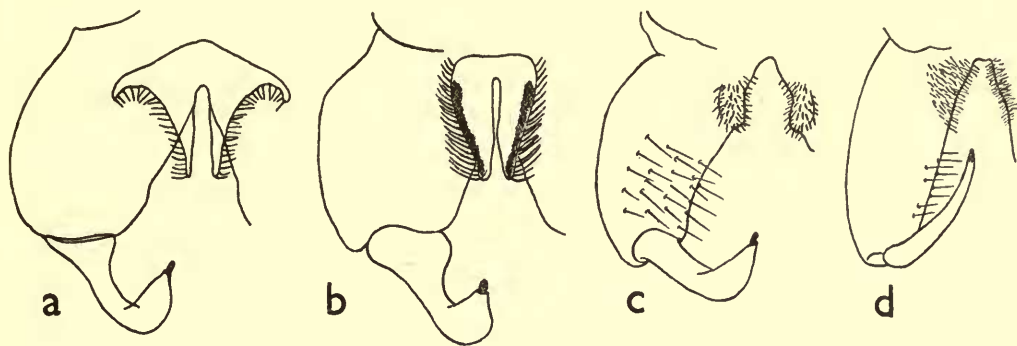


FIG. 6. Male hypopygia of *Pentaneura* sens. str. (a) *P. cygnus*; (b) *P. trifascia*; (c) *P. tinctoria*; (d) *P. nigromarmorata*.

***Pentaneura* (*Pentaneura*) *trifascia* Freeman**

*Pentaneura trifascia* Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) 23 : 172.

Allied to *P. cygnus* but readily distinguished by the different wing pattern and structure of the basal appendages of the male hypopygium; the size is larger and the thorax often has a cross-banded appearance.

*Male*. Wing length 2.6-3.8 mm.

*Head*, mouthparts and antennae brown, A.R. about 1.3-1.5. *Thorax* largely brownish, mesonotal stripes separate, shoulders and prescutellar area yellowish and pruinose; posterior half of median stripe and anterior halves of lateral stripes often darker, giving thorax a cross-banded appearance; scutellum pale. *Legs* brown or pale, unmarked except for a subapical dark ring on the femora. *Wings* with dark macrotrichia arranged as shown in text-fig. 5, *b*, more or less in three fasciae; spot in centre of cell  $R_5$  rather darker than others, venation as shown. *Halteres* yellow. *Abdomen* in dark specimens mainly blackish, segment 1 pale, segments 2-5 with apical half or third pale; in paler specimens segments 1-5 mainly pale; hypopygium either entirely black or partially yellow; structure (Text-fig. 6, *b*) very similar to *P. cygnus*, but basal coxite structures not produced laterally and each has a thickening rod.

*Female*. Resembles male in colour and pattern except for abdomen which is dark with all segments paler apically; antennae 12-segmented.

The holotype female is in the British Museum. Type locality CAPE PROVINCE, Tulbagh Barrage.

DISTRIBUTION. ABYSSINIA : 3 ♀, Dessie, 28.xii.35 (*J. W. S. Macfie*). KENYA : 1 ♀, Kabete, xi.1913 (*T. J. Anderson*) ; 1 ♂, Mt. Elgon, Heath Zone, 10,500–11,500 ft. ii.1935 (*F. W. Edwards*). BELGIAN CONGO : 1 ♂, Elisabethville, xii.38 (*H. J. Brédo*). NYASALAND : 1 ♂, Blantyre, 21.v.14 (*J. B. Davey*) ; 1 ♀, Zomba, August (*H. S. Stannus*). NATAL : 1 ♂, Van Reenen, Drakensburg, xii.1926 (*R. E. Turner*) ; 7 ♂, 7 ♀, Giant's Castle Camp, Drakensburg, 18–30.ix.53 (*A. D. Harrison*). CAPE PROVINCE : 2 ♀, Tulbagh Barrage, 17.xi.53 (*K. M. F. Scott*). S. W. AFRICA : 17 ♀, Kaokoveldt, Ohopoho, 4.vi.51 (*Swedish S. Afr. Exp.*).

*Pentaneura (Pentaneura) tinctoria* sp. n.

Easily distinguished from the other species with slight darkening at the knees because the wing membrane is deeply stained beneath some of the spots ; male styles not unlike those of *P. cygnus* but basal coxite appendages absent.

*Male*. Wing length 2.5 mm.

*Head* brownish yellow, mouthparts darker brown, antennae pale, scape dark, A.R. 1.1. *Thorax* brown, shoulders and scutellum yellow, lines of bristles and prescutellar area pruinose. *Legs* pale brown or yellowish, femora and tibiae slightly darkened above and below the knees, L.R. about 1.5. *Wings* (Text-fig. 5, *c* of female) with spots of black macrotrichia as shown, but with some of the spots, particularly the one in the middle of cell  $R_5$ , the membrane is deeply stained so that the spot is readily visible even if the macrotrichia are abraded. Halteres white. *Abdomen* with segments 1–5 whitish pruinose, each with a darker basal band which is progressively wider until it occupies about half of segment 5 ; remainder of abdomen dark. Hypopygium (Text-fig. 6, *c*) with styles not unlike those of *cygnus*, coxites with a small basal lobe and hair patch but without large appendages.

*Female*. Quite similar to male in colour and pattern, except for abdomen which is brown, each segment pruinose on apical half.

Holotype, male, in British Museum.

DISTRIBUTION. NATAL : holotype male and 2 ♀ paratypes, Mooi River, Rôsetta, 30.ix.53 (*A. D. Harrison*).

*Pentaneura (Pentaneura) teesdalei* sp. n.

A very small pale species, readily distinguished from all other African species known to me by the wing pattern, dark knees, and abdominal pattern.

*Male*. Wing length 1.3 mm.

*Head*, mouthparts, antennae pale yellow, scape brown, A.R. 1.2. *Thorax* pale yellow with brown stripes, postnotum and sternopleuron. *Legs* very pale, narrowly blackened at the knees, hairs moderately developed. *Wings* (Text-fig. 5, *d*) with macrotrichia arranged as shown. Halteres white. *Abdomen* white with black bands occupying basal halves of segments 3 and 4, segment 2 very narrowly dark at the base, 6 and 7 more or less darkened. Hypopygium very similar to that of *P. nigromarmorata* (Text-fig. 6, *d*).

*Female*. Similar to male in colour except for abdomen which is pale with a dark mark on each segment ; antennae 12-segmented.

Holotype male in British Museum.

DISTRIBUTION. KENYA : holotype male and 12 ♂, 13 ♀ paratypes, Kitui, 29.vi.53 (C. T. Teesdale).

***Pentaneura (Pentaneura) rutshuruiensis* Goetghebuer**

*Ablabesmyia rutshuruiensis* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 362.

A small pale insect, male with narrow dark markings on abdomen ; a small cloud over cross-vein distinguishes it from other African species.

*Male.* Wing length 1.8 mm.

*Head* yellowish, pedicel brown, A.R. 1.0. *Thorax* yellowish brown, mesonotal stripes brown, central one divided, intervening areas pruinose, bristles brown. *Legs* translucent yellowish brown, L.R. 0.7, posterior tibia one and a half times as long as femur, tibia clothed with long hairs, pulvilli absent. *Wings* hyaline, cross-vein darkened and surrounded by a small cloud ; membrane clothed fairly densely and evenly with dark macrotrichia which are absent from upper basal cell and base of cell  $R_5$ , venation as in *P. meilloni*, costa reaching to just beyond level of  $M_{3+4}$ . Halteres white. *Abdomen* white, segment 1 with a dark mark each side, segments 2-7 with dark rings occupying more or less the basal third, segment 8 pale, hypopygium dark and simple, hairs pale.

*Female.* Very similar to male, abdomen unicolorous yellowish brown ; antennae 12-segmented.

Holotype female in Musée Royal du Congo Belge, paratype in British Museum. Type locality, BELGIAN CONGO, Rutshuru.

DISTRIBUTION. BELGIAN CONGO : 4 ♂, 2 ♀, Rutshuru (*de Wulf and de Witte*). CAPE PROVINCE : 5 ♂, 1 ♀, Berg River, French Hoek, 26.xi.53 (*K. M. F. Scott*).

***Pentaneura (Pentaneura) nigromarmorata* Goetghebuer**

*Ablabesmyia nigromarmorata* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 361.

Easily recognized in the female sex by the five well marked pale areas on the otherwise dark wings ; in the male there is less definition of the pale areas. General body colour brown, legs unmarked.

*Male.* Wing length 2 mm.

*Head* and antennae brown, mouthparts slightly darker, A.R. 1.3. *Thorax* brown with silvery pruinosity on shoulders, between stripes and around prescutellar area ; scutellum yellow, bristles brown. *Legs* yellowish brown, without markings, posterior legs with well developed but not particularly long hairs. *Wings* with pattern basically similar to that of female (Text-fig. 5, *e*) but much less strongly developed ; membrane mainly covered with dark macrotrichia, but with five or six areas of pale macrotrichia rather larger than shown for the female and there is an additional one at the apex. Halteres yellow. *Abdomen* brown, segments 2-5 with apical half pale ; hypopygium simple (Text-fig. 6, *d*).

*Female.* Colour of head, thorax and legs similar to male, abdomen brown,

segments paler apically. Wings with dark macrotrichia over most of their surface and with rather distinctive areas of pale macrotrichia as shown in Text-fig. 5, *e*.

I have not seen the holotype, which is a female in the Musée Royal du Congo Belge. Type locality, BELGIAN CONGO, Rutshuru.

DISTRIBUTION. BELGIAN CONGO: Rutshuru. TRANSVAAL: 1 ♀, Johannesburg, v. 1930 (*B. de Meillon*). NATAL: 5 ♂, Tugela River, 17.30.ix.53 (*A. D. Harrison*). CAPE PROVINCE: 1 ♂, Berg River, Hermon (*K. M. F. Scott*); 2 ♂, 1 ♀, Kokstad, 21-22.iii.53 (*G. H. Satchell*). S. W. AFRICA: 2 ♂, Kaokoveldt, Ohopoho, 4.vi.51 (*Swedish S. Afr. Exp.*).

***Pentaneura (Pentaneura) septemguttata* sp. n.**

A distinctive light brown species, not unlike *P. nigromarmorata* but easily distinguished by the additional pale spots on the wings and by the presence of two transverse pruinose bands on the thorax.

*Male*. Wing length 2.2 mm.

*Head* brown, mouthparts paler, antennae and plumes brown, A.R. 1.75. *Thorax* light brown, with pruinosity as two bands, one at the level of the shoulders, the other just anterior to wing base; prothorax and pleura also pruinose, postnotum dark apically. *Legs* pale yellowish, unmarked, L.R. 0.7. *Wings* (Text-fig. 5, *f* of female) mostly covered with dark macrotrichia, but with seven well marked areas of pale hairs as shown, the two spots near the apex of cell  $M_1$  are especially characteristic. Halteres pale. *Abdomen* yellowish, segments 3, 4, 6, 7, 8 with a darker spot bearing dark hairs; hypopygium simple.

*Female*. Similar to male.

Holotype male and paratype 1 female, NYASALAND: Ruo, 6.iv.16 (*R. C. Wood*) both in British Museum.

***Pentaneura (Pentaneura) octomaculata* Freeman**

*Pentaneura octomaculata* Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) 23: 172.

Very similar to *P. nigromarmorata* in colour and structure but easily distinguished by the quite different wing pattern.

*Male*. Wing length 2 mm.

*Wings* (Text-fig. 5, *g*) with eight well defined black spots formed of dark macrotrichia; in addition there are dark macrotrichia along both branches of M and along the anal vein. In all other respects similar to *P. nigromarmorata*.

*Female*. Resembles male.

Holotype female in British Museum.

DISTRIBUTION. Known only from the type locality, CAPE PROVINCE: 3 ♀, 12.ii.53 and 1 ♂, 25.i.53 (*K. M. F. Scott*).

***Pentaneura (Pentaneura) edwardsi* sp. n.**

A large dark species with plain wings belonging to Group D of Edwards' classification. Costa ending before level of  $M_{1+2}$ , legs yellow, abdomen dark, hypopygium pale.



*Male.* Wing length 3.5 mm.

*Head,* mouthparts, antennae brown, A.R. 1.2. *Thorax* brown, pleural membrane yellow; stripes dark brown and separated by pruinosity along the lines of the bristles, on the shoulders and prescutellar area; central stripe similarly split longitudinally; bristles dark brown, scutellum yellow. *Legs* yellowish, rather long, bristles normal, length about two or three times diameter of tibia; anterior tibia slightly longer than femur, those of middle legs about equal, posterior tibia one and a half times as long as femur. *Wings* unmarked, hyaline, thickly clothed with dark macrotrichia in all cells except costal and upper basal; costa reaching well beyond level of  $M_{3+4}$  but not beyond  $M_{1+2}$  (Text-fig. 7, *a*). Halteres white.

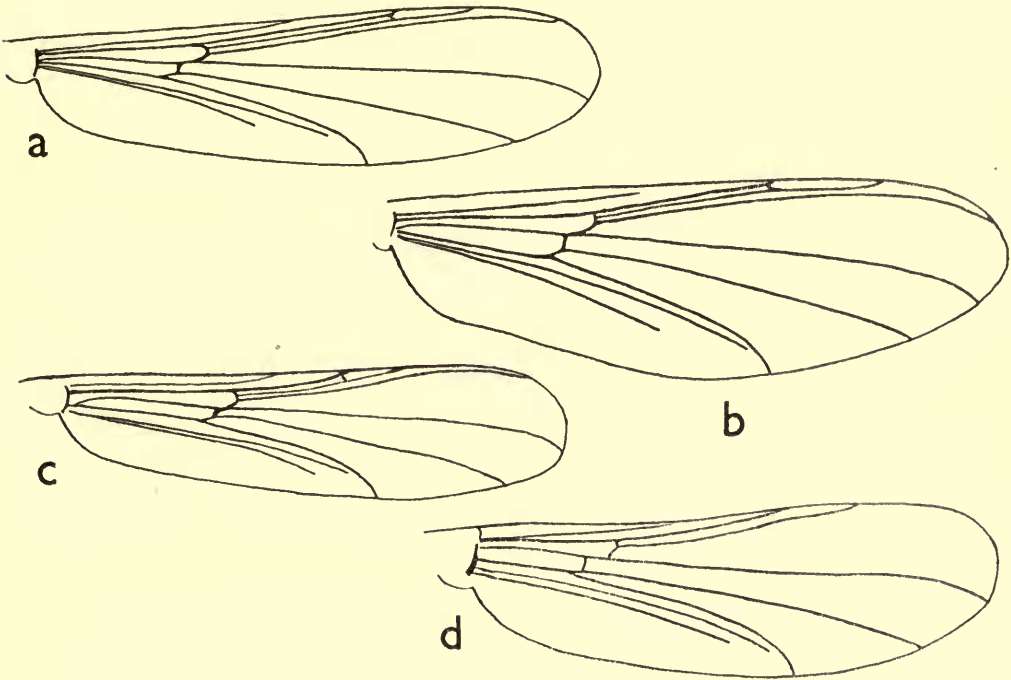


FIG. 7. Wings of *Pentaneura* sens. str. (a) *P. edwardsi*, male; (b) *P. longinervis*, female; (c) *P. meilloni*, male; (d) *P. comata*, male.

*Abdomen* dark, paler at the incisures, in segments 1-5 this paleness tends to spread obscurely; hypopygium white, simple.

*Female* not known.

Holotype male, KENYA, Aberdare Range, x.1934, Mt. Kinangop, 10,000 ft. (F. W. Edwards) in British Museum.

***Pentaneura (Pentaneura) longinervis* sp. n.**

Another large species rather similar to *P. edwardsi*, and might at first be taken for the female of that species; the different venation with the costa reaching beyond  $M_{1+2}$  suggests that it belongs to a separate species.

*Female.* Wing length 5.0 mm.

*Head*, mouthparts and antennae brown, antennae 12-segmented, segment 2 twice as long as segment 3, palpi as long as antennae. *Thorax* blackish, stripes fused laterally, but shoulders and pronotum, a line dividing central stripes and prescutellar area yellowish and pruinose; lateral margins and lines of dorso-central bristles also pruinose, clearly demarcating lateral stripes; bristles dark, scutellum yellowish at apex. *Legs* yellowish brown, proportions as in *edwardsi*. *Wings* (Text-fig. 7, *b*) hyaline except for costal cell which is darker, thickly clothed with dark macrotrichia; costa reaching beyond level of apex of  $M_{1+2}$ . Halteres pale brownish yellow. *Abdomen* with blackish tergites and paler sternites, apices of segments pale, bristles black.

*Male* not known.

Holotype female, KENYA, Mt. Elgon, Heath Zone, 10,500–11,500 ft., ii.1935 (*F. W. Edwards*) in British Museum.

***Pentaneura (Pentaneura) uniformis* Goetghebuer**

*Ablabesmyia uniformis* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 363.

This species may be distinguished from other pale species with unmarked wings, except *pallidissima* Kieffer (*q.v.*), by the long costa which is considerably produced, also the posterior tibiae are one and a half times as long as the femora.

*Male.* Wing length 2 mm.

*Head*, antennae, mouthparts yellowish, A.R. 2.5. *Thorax* whitish, stripes, postnotum and sternopleuron yellowish brown. *Legs* very pale, hairs long but not as long as in *hirsuta*; posterior tibia one and a half times as long as tibia; L.R. 0.8. *Wings* quite unmarked, clothed all over with macrotrichia, costa produced and ending on a level with tip of  $M_{1+2}$ , r-m opposite base of  $M_{3+4}$ . Halteres pale. *Abdomen* whitish with dark basal bands on segments 2–6, 7 rather darker, hypopygium dark, styles and coxites simple.

*Female.* Similar to male in colour; antennae 12-segmented, hairs of legs shorter.

I have not seen the type, which is a female in Musée Royal du Congo Belge, but I have seen a specimen collected at the same time. Type locality Belgian Congo, Escarpement Kabasha, Chambi.

DISTRIBUTION. BELGIAN CONGO: 1 ♀, Escarpement Kabasha, Chambi, x.1933 (*de Wulf*); 1 ♂, Parc Albert, Cratère Mugunga, 1933 (*de Wulf*); 1 ♀, Rutshuru, 1285 m., 23–25.xii.33 (*G. F. de Witte*).

***Pentaneura (Pentaneura) pallidissima* Kieffer**

*Isoplastus pallidissimus* Kieffer, 1911, *Trans. Linn. Soc. Lond.* 14 : 364.

The only specimen known of this species is the female holotype which is in the British Museum. Structurally it is indistinguishable from the female of *uniformis* Goetghebuer but is somewhat smaller (wing length 1.5 mm.) and more uniformly yellow. Until more material is available of both sexes of both species I am unwilling to synonymize them. Kieffer was wrong in saying that the costa was not produced.

Type locality, SEYCHELLES, Mahé, 1908-9 (*Percy Sladen Trust Exp. to Indian Ocean*).

*Pentaneura (Pentaneura) meilloni* sp. n.

Thorax yellowish brown with darker bristles, abdomen dark with pale rings at apices of segments 2-5, leg hairs short, wings quite unmarked.

*Male*. Wing length 2.0 mm.

*Head*, antennae and mouthparts brown, A.R. about 0.8. *Thorax* yellowish brown, stripes distinguishable because intervening areas are slightly pruinose, bristles long and dark brown, scutellum with long dark bristles, postnotum dark. *Legs* uniformly pale brown, hairs on posterior tibiae short, only 2-4 times diameter of tibia, anterior and middle tibiae and femur subequal, L.R. 0.7; posterior tibia longer than femur; pulvilli absent. *Wings* quite unmarked even at cross-vein, macrotrichia brown and numerous all over wing surface, except in the two basal cells; tip of costa slightly distal to  $M_{3+4}$  (Text-fig. 7, c), anal area reduced. Halteres pale. *Abdomen* dark with pale rings occupying apical half of segment 2 and apical third of segments 3-5, segments 1 obscurely pale; the dark areas bear long dark bristles almost as long as the segment.

*Female* very similar to the male; antennae 12-segmented, some macrotrichia in lower basal cell, abdomen without well defined rings.

Holotype male, and 2 ♂, 1 ♀, paratypes, TRANSVAAL, Johannesburg, iii.1930 (*B. de Meillon*) in British Museum. Other paratypes, same locality and collector, 1 ♂, 1 ♀, ii.1930, 2 ♀, v.1930.

*Pentaneura (Pentaneura) hirsuta* sp. n.

Quite similar to *meilloni* but easily distinguished by the longer posterior tibial hairs of the male, the pale thoracic bristles and more brilliant pruinosity on the shoulders.

*Male*. Wing length 2 mm.

*Head*, antennae and mouthparts yellowish brown; A.R. about 1.6. *Thorax* yellowish brown, stripes indicated by lines of pruinosity, shoulders and prothorax especially brilliant pruinose, bristles pale, not contrasting with background. *Legs* pale yellowish brown, hairs on posterior tibiae long, 6-8 times diameter of tibia, sometimes one-third length of tibia; L.R. 0.6, pulvilli absent. *Wings* as in *P. meilloni*, halteres pale. *Abdomen* with segments 1-5 pale with rather variable dark markings, remainder dark; segment 1 completely pale, 2 may be quite pale or it may be dark on the basal half, 3 and 4 usually dark on basal two-thirds, 5 may be largely pale or it may have dark markings; all segments with long hairs on basal halves, pale on pale areas, dark on dark areas. Hypopygium simple.

*Female*. Generally similar to male; antennae with 12 segments, hairs of body and legs pale, posterior tibiae without the long hairs, abdomen uniformly brown.

Holotype in British Museum.

DISTRIBUTION. Holotype male and 6 ♂, 2 ♀, paratypes, NATAL, Eshowe, Shaw's Drift, 14.ii-25.iv.35 (*B. de Meillon*). Other paratypes, NATAL; 1 ♂, Eshowe, Tributary to Umlalazi River, 27.iii.35 (*B. de Meillon*). Belgian Congo: 1 ♂,

Elisabethville, 1927 (*J. Schwetz*). Some specimens from FRENCH WEST AFRICA, Niger Province, Aïr, Mt. Baguezan, probably belong here; they are very similar structurally but the thorax is rather darker and I prefer not to make them paratypes (*Inst. Fr. d'Afrique Noire*).

*Pentaneura (Pentaneura) longipes* sp. n.

Quite similar to the two preceding species but easily distinguished by the longer middle tibiae, darker femora and denser macrotrichia. Possibly the male of *palpalis*, but middle tibiae much longer.

*Male*. Wing length 2.5 mm.

*Head*, antennal pedicel and mouthparts yellow, flagellum and plumes dark, A.R. 2. *Thorax* whitish yellow with yellowish brown stripes, pruinose between stripes and on shoulders, bristles mainly golden. *Legs* with femora darker than tibiae and tarsi, which are whitish with pale hair, tibiae with short hairs as in *P. meilloni*; anterior tibiae about equal in length to femur, L.R. 0.7; middle and posterior tibiae one and a half times as long as femora; pulvilli absent. *Wings* as in *P. meilloni*, but more densely clothed with macrotrichia, which are especially dense at apex of costa; halteres pale. *Abdomen* mainly dark with pale incisures, segments 1 and 4 mainly pale, whitish, hypopygium white; hairs dark on dark areas, pale on segments 1, 4 and hypopygium. Hypopygium simple.

*Female* not known (but see *palpalis*).

Holotype male, UGANDA, Kampala, 4.ix.29 (*G. H. E. Hopkins*) in British Museum.

*Pentaneura (Pentaneura) palpalis* Goetghebuer

*Ablabesmyia palpalis* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27: 362.

Although the palpi are as long as the antennae this is not an infrequent character in the genus; the best distinguishing feature from all except *longipes* lies in the dense covering of dark hair on the wings.

*Female*. Wing length 2.5 mm.

*Head*, antennae and mouthparts brown; palpi as long as antennae, antennae 12-segmented. *Thorax* with yellowish brown background and dark brown stripes, postnotum and sternopleuron; mesonotum fairly heavily pruinose, bristles long and brown. *Legs* yellowish brown, not unduly hairy, L.R. about 0.8, posterior tibia one and a half times as long as femur, tibiae and femora of other legs more or less subequal (cf. *longipes*). *Wings* without markings, densely clothed with dark macrotrichia which are very dense at apex of costa, costa not produced, ending at a level half-way between apices of  $M_{1+2}$  and  $M_{3+4}$  as in *P. meilloni* (Text-fig. 7, c). Halteres white. *Abdomen* dark brown, quite densely clothed with dark hairs.

*Male* not known, but it is possible that *longipes* is the male of this species.

I have not seen the holotype, which is a female in the Musée Royal du Congo Belge, but Dr. Benoit has kindly compared the Natal specimen with it.

DISTRIBUTION. Type locality, BELGIAN CONGO: Rutshuru. NATAL: 1 ♀, Tugela River, 17.ix.53 (*A. D. Harrison*).



***Pentaneura (Pentaneura) interrupta* Goetghebuer**

*Ablabesmyia interrupta* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 361.

I have seen no specimens of this species. It is very similar to *P. hirsuta* but can be readily separated by the presence of a narrow grey band across the wing and by the arrangement of white on the abdomen. The following description is based on that given by Goetghebuer.

*Male.* Length 4 mm.

Yellowish ; pedicel yellow, flagellum black ; mesonotal stripes brown red ; sternopleuron and postnotum brown ; scutellum yellow. Abdomen with segments 1, 2, 4 entirely white and segments 3, 5, 6 and 7 spotted with brown black on their distal halves, 8 entirely brown black. Legs yellow, halteres white. A.R. 1.6, L.R. 0.45. Anterior tarsi not bearded, segment 4 twice length of 5, posterior legs with long hairs. Wings hyaline with a feeble narrow transverse smoky cloud in the middle and another at the apex. Hypopygium with style nearly straight.

Type locality, BELGIAN CONGO, Rutshuru, holotype in Musée Royal du Congo Belge.

***Pentaneura (Pentaneura) aurantiacus* Kieffer**

*Isoplastus aurantiacus* Kieffer, 1911, *Trans. Linn. Soc. Lond.* 14 : 365.

I am doubtful whether the two specimens which form the type series of this species belong to the same species. No type was selected by Kieffer and as they are therefore cotypes I am selecting the one with obviously produced costa as lectotype. It is a brown insect with strongly produced costa.

*Female.* Wing length 1.3 mm.

*Head* brown, palpi broken, antennae 12-segmented, segments moniliform. *Thorax* dark brown, strongly pruinose, hairs shorter than usual, and brown. *Legs* pale, tarsi broken, posterior tibia equal to femur. *Wings* plain, unmarked ;  $R_{4+5}$  meeting costa opposite tip of  $M_{3+4}$ , costa strongly produced for about one third of the distance to  $M_{1+2}$ , r-m opposite base of  $M_{3+4}$ . Halteres pale. *Abdomen* dark brown.

Lectotype in British Museum.

**DISTRIBUTION.** Known only from SEYCHELLES, Mahé (*Percy Sladen Trust Exp. to Indian Ocean*).

***Pentaneura (Pentaneura) minimus* Kieffer**

*Isoplastus minimus* Kieffer, 1911, *Trans. Linn. Soc. Lond.* 14 : 356.

A tiny species with plain wings, costa ending opposite  $M_{3+4}$ , abdomen with a central dark line. The holotype is a poor specimen gummed on to a piece of card and it is thus not possible to give a full diagnosis of the species, but it can be said that it has a certain resemblance to the "*Nilotanypus*" group of species. Distinguished from *micra* by its paler colour, longer costa and slightly larger size.

*Male.* Wing length 1 mm.

*Head* yellowish, palpi and antennae broken, eyes bare. *Thorax* yellowish brown with long brown hairs. *Legs* yellowish brown, hairs fairly long, tarsi broken,

posterior tibia probably equal to femur. *Wings* plain, thickly clothed with macrotrichia; costa rather retracted, ending opposite  $M_{3+4}$ . Halteres pale. *Abdomen* yellowish segments 1-5 with a median dorsal blackish line, apical segments blackish, hypopygium yellow.

Lectotype in British Museum.

DISTRIBUTION. Known only from the holotype, SEYCHELLES, Mahé (*Percy Sladen Trust Exp. to Indian Ocean*).

*Pentaneura (Pentaneura) micra* sp. n.

A minute fly with retracted costa; eyes bare, body dark, legs pale, apices of tibiae and tarsal segments darkened, antennae of female with 12 segments. Distinguished from *P. minimus* by its darker colour, greater retraction of costa and smaller size.

*Female*. Wing length 0.75 mm., body length 0.6 mm.

*Head* dark, palpi yellowish, antennae pale, with 12 segments; eyes bare. *Thorax* blackish and pruinose, bristles long and dark brown. *Legs* pale, tibiae and tarsi almost whitish with apices of segments darkened; posterior tibia equal to femur. *Wings* plain, unmarked, densely clothed with dark macrotrichia except in basal cells; costa retracted, ending well basal to level of apex of  $M_{3+4}$ ,  $R_{2+3}$  appears to be absent. Halteres yellow. *Abdomen* entirely dark.

Holotype female and 9 female paratypes, NIGERIA: Niger Province, Abuja, 27.xii.54 (*R. Crosskey*), all in British Museum.

*Pentaneura (Pentaneura) comata* Freeman

*Pentaneura comata* Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B), 22: 129.

A minute black insect without pale markings belonging to the group *Nilotanypus* which is characterized by the retracted costa, absence of  $R_{2+3}$ , wide separation of cross-veins and pubescent eyes. In the type series A.R. was about 1, but specimens received later from Cape Province have a lower ratio, one specimen being as low as 0.6. Two males from Uganda are extremely similar to the S. African specimens, but their antennal ratios are only 0.4. This is much the same as the ratio given by Kieffer for *P. remotissimus* but in that species the wings of the male are said to have macrotrichia reduced. I am assuming the antennal ratio to be variable and that Kieffer's species is separate.

*Male*. Wing length 1.0-1.4 mm.

*Head* black with greyish pruinosity; antennae with black plumes, A.R. variable, varying from 0.4-1.0; eyes clothed with short pubescence, separated dorsally by about twice their apical width. *Thorax* black, mesonotum with four broad stripes marked out in brownish-grey pruinosity, all hairs black. *Legs* translucent brown with dark hairs and no markings; anterior tarsi without beard, L.R. 0.6. *Wings* hyaline, unmarked, membrane evenly clothed, except in basal cell, with dark macrotrichia; costa retracted ending before tip of  $M_{3+4}$  (Text-fig. 7, d);  $R_{2+3}$  absent, base of  $M_{3+4}$  well basal to r-m. Halteres with pale knobs. *Abdomen* black, hypopygium with long black hairs.

*Female* very similar to male.

Holotype in British Museum.

DISTRIBUTION. CAPE PROVINCE: 4 ♂, 2 ♀, Berg River, Piquetberg, 9.ix.52-30.iv.53 (*K. M. F. Scott*) (type locality); 1 ♂, Cecilia's Drift, 21.i.53 (*K. M. F. Scott*); 1 ♂, Berg River, Wellington, 17.xii.52 (*K. M. F. Scott*). TRANSVAAL: 1 ♂, Kruger National Park, Letaba, 6.v.51 (*Swedish S. Afr. Exp.*). UGANDA: 2 ♂, Ruwenzori Range, Kilembe, 4,500 ft., xii.1934-i.1935 (*F. W. Edwards*).

***Pentaneura (Pentaneura) remotissima* Kieffer**

*Nilotanypus remotissimus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 191.

I have seen no material of this species. As mentioned above under *P. comata* it appears to differ from that species mainly in the reduction of the macrotrichia on the wing membrane. Kieffer says that in the male macrotrichia are present only at the tip, and in the female they are sparse. It is possible that his specimens were rubbed, but even then the hair pits should have been visible. The antennal ratio is low—0.3-0.4, but, as mentioned under *P. comata*, this may not be significant. More material may show that the two species are the same.

Type locality ANGLO-EGYPTIAN SUDAN, Mongola.

***Pentaneura* Phillipi subgenus *Ablabesmyia* Johannsen**

*Isoplastus* Skuse, 1889.

*Ablabesmyia* Johannsen, 1905 (in part); Goetghebuer, 1935 (in part).

*Tanypus* (Meigen) Kieffer, 1923.

*Pentaneura* Edwards, 1929 (Group A); Johannsen, 1946 (Group A); Freeman, 1953 (in part).

The males of this subgenus all possess a complex structure at the base of the coxites which has been studied by Johannsen in the North American species and which is probably a form of aedeagus. It is difficult to examine except in distended, mounted and stained specimens. I have not been successful in distending them artificially and I have, therefore, only been able to study them in specimens in which they are distended naturally, which form only a small proportion of the available material.

The structures seem to consist essentially of a pair of simple arms (Text-fig. 10, *d*) and two or three pairs of hairy lobes. So far as I can see there are specific differences in the shapes of the parts.

The apex of the style is also unusual. The spine is subapical and the true apex of the style is flattened and fluted; it is often also expanded and disc-like. The other characters of the subgenus are given in the key on p. 21, the characters concerning the definition of the prescutellar area and the divergence of the acrostichal bristles around it, do not seem to have been noted before.

KEY TO AFRICAN SPECIES OF *Pentaneura* SUBG. *Ablabesmyia*

- |  |   |
|--|---|
| 1. Wings without well developed marbled pattern, cell $R_{4+5}$ without areas of dark macrotrichia . . . . . | 2 |
| Wings with well marked marbled pattern, cell $R_{4+5}$ with at least one area of dark macrotrichia . . . . . | 3 |

2. Costa produced, wings pale, basal third greyish . . . . . *digitata* Kieffer  
Costa not produced, wings clear and unmarked except for a grey spot at apex of  $R_{2+3}$  . . . . . *subrecta* Kieffer
3. Thorax with cross-banded appearance (Text-fig. 8, *a*), femora and tibiae each with four black rings (Text-fig. 8, *c*) . . . . . *nilotica* Kieffer  
Thorax not cross-banded, femora usually with less than four rings . . . . . 4
4. Pattern simpler, as in Text-fig. 9, *b*, cell  $R_{4+5}$  with only two spots . . . . . 5  
Pattern more complex . . . . . 6
5. Cell  $M_{1+2}$  with a central spot . . . . . *melaleuca* Goetghebuer  
Cell  $M_{1+2}$  without a central spot . . . . . *rufa* Kieffer
6. Cell  $R_{4+5}$  with a quadrate central spot and two pairs of superposed spots in the outer half (Text-fig. 9, *c*) . . . . . *appendiculata* Kieffer  
Central spot in cell  $R_{4+5}$  is not quadrate (Text-fig. 9, *d, e*), outer spots not superposed . . . . . 7
7. Larger species, wing length 2-3.5 mm., normally with black spots at the apices of  $R_1$ ,  $R_{2+3}$ , and  $R_{4+5}$ , female antenna with 12 segments . . . . . *dusoleili* Goetghebuer  
Smaller species, wing length 1.3-1.6 mm., black spots at apices of  $R_1$  and  $R_{4+5}$  only, female antenna with 11 segments . . . . . *pictipes* Kieffer

### *Pentaneura (Ablabesmyia) digitata* Kieffer

*Tanypus digitatus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 193.

I have seen no specimens of this small species, but it should be easy to recognize because of the produced costa and pale wings. The following is a summary of its characters taken from Kieffer's description.

*Female.* Length 1 mm.

Antennae 12 segmented; thoracic bands and markings yellowish; wings pale (? abraded), proximal third slightly greyish, a grey spot at apex of  $R_{2+3}$ ; costa produced for about length of r-m cross-vein; femora with two black rings, one at the middle, the other subapical; tibiae black with three narrow white rings; anterior tibial spur dentate, with five free teeth, the middle one twice as long as the others.

Type locality, FRENCH CAMEROONS : Kribi.

### *Pentaneura (Ablabesmyia) subrecta* Kieffer

*Tanypus subrectus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 199.

I have seen no specimens of this species which was described from a female 1.5 mm. long. According to Kieffer's description it should not be difficult to recognize because the wings (? abraded) have no markings except for a grey spot at the apex of  $R_{2+3}$ . Antennae 12-segmented,  $Cu_1$  not strongly curved, femora with two black rings one at the middle and one subapical, tibiae black with three narrow white rings.

Type locality, FRENCH CAMEROONS : Kribi.

### *Pentaneura (Ablabesmyia) nilotica* Kieffer

*Tanypus niloticus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 200.

? *Tanypus congoensis* Kieffer, 1923, *Ibid.* 92 : 198.

? *Tanypus kribiensis* Kieffer, 1923, *Ibid.* 92 : 202.

*Ablabesmyia tricolor* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 363 (SYN. NOV.).



This species is recognized by the cross-banded thorax, heavily banded legs and dark wings.

The description given by Kieffer of *niloticus* mentions the pale anterior third of the mesonotum and the four bands on tibiae and femora; there seems to be doubt that this is an earlier description of the species later described by Goetghebuer under the name *tricolor*.

Under *T. congoensis* Kieffer mentions the dark wings with many poorly defined pale spots and the dark legs, though in his specimens the tibiae were black with two white rings beyond the middle (there is an error in his key at couplet 7, the names

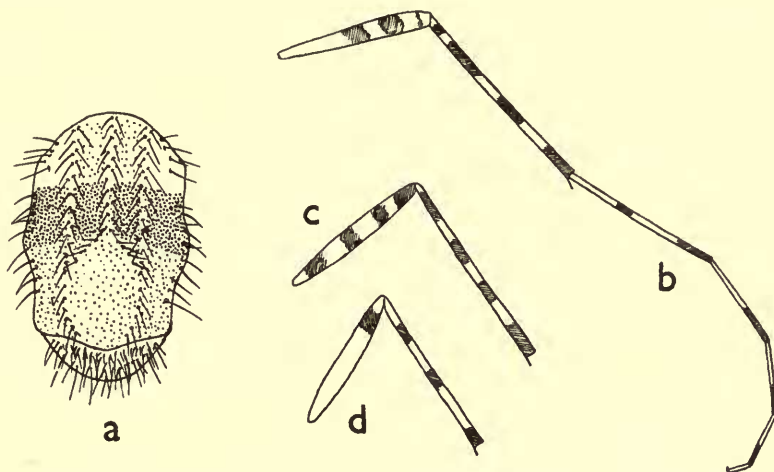


FIG. 8. Thorax and legs of *Pentaneura* (*Ablabesmyia*). (a) thorax of female *P. niloticus*; (b) posterior leg of male *P. appendiculata*; (c) the same of *P. nilotica*; (d) the same of *P. melaleuca*.

*congoensis* and *bicinctus* should be interchanged). I have a series of females from the southern Anglo-Egyptian Sudan not unlike this description in colour, but the specimens are much smaller; I am tentatively identifying them as *niloticus* until I can examine a male, although the thoracic pattern is not very typical. The description given by Kieffer of *kribiensis* is poor, but he mentions the grey wing colour with numerous pale spots and the presence of three dark rings on the femur and four on the tibia which suggests that it is another description of *niloticus*.

*Male.* Wing length 1.8–2.3 mm.

*Head*, mouthparts and pedicel brown, flagellum paler, A.R. 1.5. *Thorax* pruinose and with cross-banded appearance (Text-fig. 8, a); anterior third pale, remainder either more or less uniformly dark or with the dark area only present as a transverse stripe, as shown in the figure; remainder of thorax brown. *Legs* with four dark rings on both femora and tibiae (Text-fig. 8, c), usually more or less as shown, but widths of rings variable to some extent, basal ring of tibia always long (cf. that of *appendiculatus*); markings of tarsi as in *appendiculatus*. *Wings* (Text-fig. 9, a) with dark macrotrichia arranged in a mottled pattern; darker markings are present over

r-m cross-vein and as a band at level of apical section of  $R_{2+3}$ . Halteres whitish. *Abdomen* with segments 1-5 mainly white, segments 6-8 dark with white incisures; segments 2-5 dark along lateral margins and with a double banded appearance due to the extension towards the centre of the ends of these dark markings; anterior dark extension may reach across as a complete band, posterior one does not; incisures of these segments pale. Hypopygium (Text-fig. 10, *a*) with characteristic coxites which tend to appear transverse, basal structures not everted in any of the specimens at my disposal, but appear to be different from *dusoleili* and *appendiculatus*; apical portion of style not strongly expanded, bristle pointed.

*Female*. Resembles male in pattern, but is darker and more contrasted in colouring. Abdomen dark, apices of segments paler, antennae 12-segmented.

I have not seen any of the types of the species listed; the types of Kieffer's species appear to be lost, that of *tricolor* is in Musée Royal du Congo Belge. Type locality of *niloticus* is ANGLO-EGYPTIAN SUDAN, Shambe; of *congoensis* is BELGIAN CONGO, District Uelle, Go; of *kribiensis* is FRENCH CAMEROONS, Kribi; of *tricolor* is BELGIAN CONGO, Parc National Albert, Vitshumbi.

DISTRIBUTION. ANGLO-EGYPTIAN SUDAN: 1 ♀, Khartoum, i.1923 (*S. Hirst*); 1 ♂, Wad Medani, ii.1952 (*D. J. Lewis*); 1 ♂, Khartoum, 24.i.53 (*D. J. Lewis*); 1 ♂, Adok, 21.xi.53 (*E. T. M. Reid*). NIGERIA: 2 ♀, Mokwa, 27.ix.09 (*Mayer*); 1 ♂, Gadau, ii.1933 (*Buxton & Lewis*); 2 ♂, Onishta (*Anderson*). BELGIAN CONGO: 2 ♂, 5 ♀ Parc National Albert, vi-ix-1935 (*H. Damas*). TANGANYIKA: 1 ♀, Kibanga 7.v.27 (*C. Christy*). S. W. AFRICA: 5 ♀, Kaokoveldt, Ohopoho 4.vi.51 (*Swedish S. Afr. Exp.*)

### *Pentaneura (Ablabesmyia) melaleuca* Goetghebuer

*Ablabesmyia melaleuca* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27: 360.

Wings with fewer markings than in some other species and without well marked black spots on the costa, femora with one black ring, tibiae with three, coxites of male hypopygium angled at the base. Specimens in which the spot in cell  $M_{1+2}$  is poorly developed resemble *rufus* Kieffer, which may thus be an earlier name for this species.

*Male*. Wing length 2.5 mm.

*Head*, mouthparts and pedicel brown, flagellum paler, plumes yellowish, A.R. 1.75. *Thorax* with blackish brown stripes separated by pruinosity, hairs yellowish, remainder of thorax blackish brown. *Legs* (Text-fig. 8, *d*); femora with subapical dark ring, tibiae with three rings, tarsi as in *appendiculatus*. *Wings* paler than in most species, with black spots on r-m cross-vein and base of posterior fork but with none on costa; dark macrotrichia arranged as shown in Text-fig. 9, *b*, but individual spots may be greater or smaller in different specimens, spot in centre of cell  $M_{1+2}$  seems sometimes to be absent. Halteres white. *Abdomen* with segments 1-5 white with variable amount of darker marking, remainder dark. Hypopygium as in Text-fig. 10, *c*; basal coxite structure not expanded in my specimens, but may be like *niloticus* though smaller, coxites with well marked angle at base, apex of style longer than in other species, not unlike that of *niloticus*.

*Female.* Wing length of available specimens only 2 mm. Antennae 12-segmented, coloration similar to male except for the abdomen which is dark with the segments only obscurely paler at their apices.

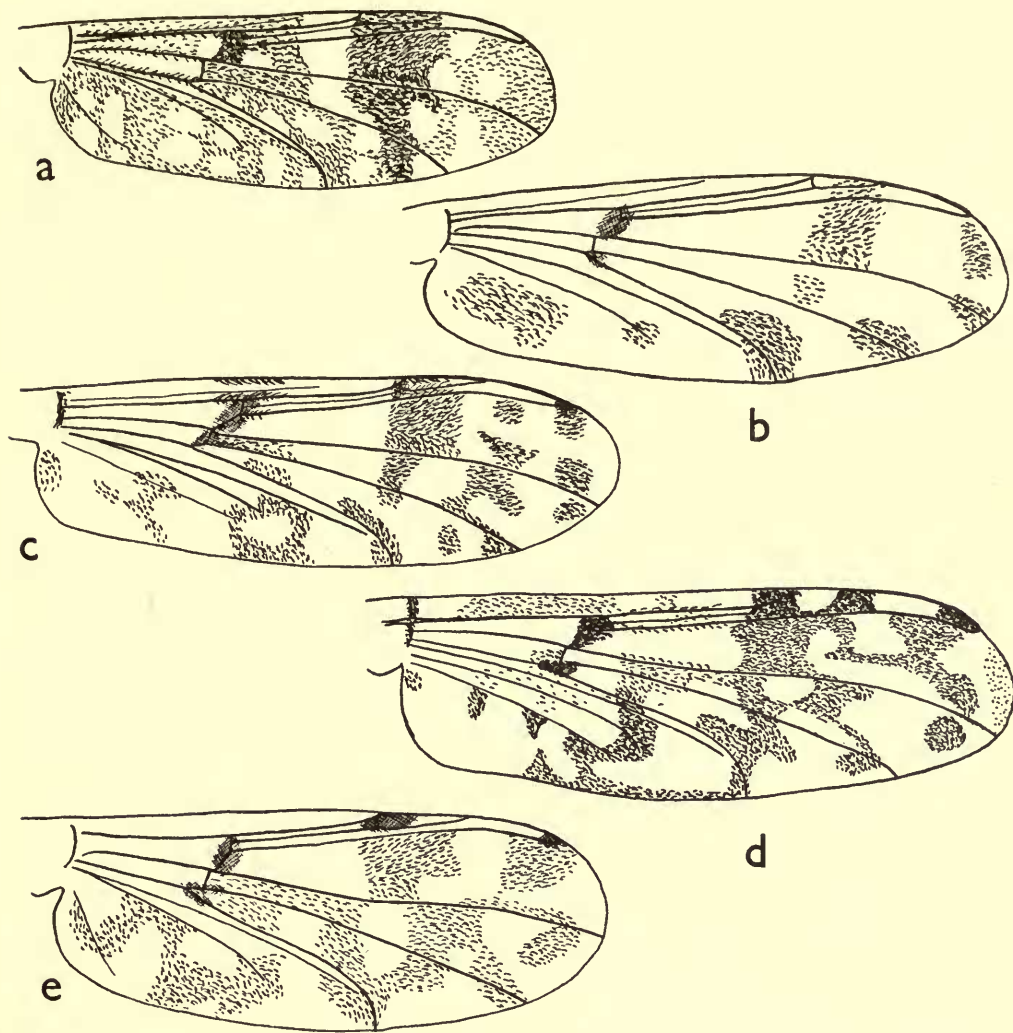


FIG. 9. Wings of females of *Pentaneura* (*Ablabesmyia*), areas of dark macrotrichia only indicated. (a) *P. nilotica*; (b) *P. melaleuca*; (c) *P. appendiculata*; (d) *P. dusoleili*; (e) *P. pictipes*.

I have not seen the holotype, which is a male in Musée Royal du Congo Belge Type locality, BELGIAN CONGO, Uganda, Numasgali.

DISTRIBUTION. SIERRA LEONE: 1 ♂, Waterloo, vii. 1924 (*A. Blacklock*). GOLD COAST: 1 ♂, 2 ♀, Ashanti, Obuasi (*W. M. Graham*). NIGERIA: 1 ♂, Onitsha,

x.1932 (*Anderson*). BELGIAN CONGO: 1 ♂, Likimi, 16.xii.27 (*A. Collart*); 1 ♀, "Congo."

*Pentaneura (Ablabesmyia) rufa* Kieffer

*Tanypus rufus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 197.

I have seen no specimens of this species, which was described from a female 1.5 mm. long. The important features of the species are the wing markings, of which the following summary is taken from the original description: there are three black spots, one on r-m, one at the fork of  $R_{2+3}$ , the third at the apex of  $R_{4+5}$ ; there are two grey spots in cell  $R_{4+5}$ , two in the anal cell and two in the posterior fork, one being along the posterior branch and the other at the apex of  $M_{3+4}$ . Each femur has a black ring at the apex, whilst there are four black rings on the anterior tibia, the other tibiae have three only.

As already noted, there is a certain resemblance to some specimens which I have placed in *melaleuca*, and it may prove to be an earlier name for that species. Owing to the great variability it is not possible to be more precise until hypopygia have been examined of specimens agreeing with the description.

Type locality FRENCH CAMEROONS, Kribi. The holotype appears to be lost.

*Pentaneura (Ablabesmyia) appendiculata* Kieffer

*Tanypus appendiculatus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 201.

? *Tanypus bicinctus* Kieffer, 1923, *Ibid.* 92 : 198.

*Ablabesmyia collarti* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 358 (SYN. NOV.).

Very similar to *P. dusoleili* but spots at apex of cell  $R_{4+5}$  usually superposed and costal margin without three distinct black spots, femora with two or three well defined black rings, tibiae usually with four. According to Kieffer's description, *T. bicinctus* has fewer wing spots, there being only two superposed ones in cell  $R_{4+5}$ ; it is difficult to be certain of its placing with the material at my disposal.

*Male.* Wing length 2.2-3.3 mm.

*Head* and thorax as in *P. dusoleili* (see below). *Legs* (Text-fig. 8, *b*) with broader bands than in *dusoleili*, femora with at least two and usually three bands which vary greatly in width and position even on different legs on the same specimen; the basal one is often broader than shown and in the basal half of the femur; tibiae with four bands, remainder as shown. *Wings* with variable markings but usually as shown in Text-fig. 9, *c*; costa with dark macrotrichia at level of r-m which is darkened, and at apices of  $R_1$  and  $R_{4+5}$ , but without three distinct spots; cell  $R_{4+5}$  with large spot which is more or less quadrate and with two pairs of superposed spots in apical half; remainder of markings not unlike *dusoleili*. Halteres white. *Abdomen*: segment 1 white, 2-4 or 5 white with lateral margins brown, brown colour extends inwards anteriorly and posteriorly on each segment, but incisures broadly pale, apical segments dark. Hypopygium (Text-fig. 10, *b*) differs from *dusoleili* in the smoother outline of the coxites; basal median sclerite more V-shaped, basal aedeagal structure not expanded in any of my specimens, but probably similar to *dusoleili*, style also similar, apex perhaps more expanded.



*Female.* Similar to male, except for abdomen which is dark with apices of segments narrowly pale.

I have seen no type material. The types of *appendiculatus* and *bicinctus* appear to be lost; locality of the former FRENCH CAMEROONS, Kribi, of the latter BELGIAN CONGO, Uelle, Go. The type of *collarti* is in Musée Royal du Congo Belge (type locality, BELGIAN CONGO, Stanleyville).

DISTRIBUTION. ANGLO-EGYPTIAN SUDAN: 1 ♂, Melut, 17.xi.53 (*E. T. M. Reid*). NIGERIA: 1 ♀, Katagum (*C. E. S. Watson*); 1 ♀, Ibi (*J. M. Pollard*). GOLD COAST: 1 ♀, Accra, vii.1916 and 1 ♀, Oblogo, 25.xii.20 (*J. W. S. Macfie*); 1 sex?, Kete Krachi, 12.x.98. UGANDA: 1 ♀, Kaduku Lango, 29.vi.11 (*R. E. McConnell*); 3 ♂, 3 ♀, Lake Bunyori, 1.viii.32 (*G. H. E. Hopkins*); 1 ♂, Entebbe, 11.v.35 (*C. B. Symes*); 1 ♀, L. Victoria (*W. W. MacDonald*). BELGIAN CONGO: 1 ♀, Yaminga, 9.iv.04 (*Dutton & Todd*); 1 ♂, Stanleyville (*Mouchet*); 1 ♂, Kwango Prov., Muela, 15.x.37 (*A. Duren*). NYASALAND: 1 ♀, Dedza Distr., vii.1913 (*J. B. Davey*). TRANSVAAL: 1 ♂, Kruger National Park, Letaba, 1.v.51 (*Swedish S. Afr. Exp.*). NATAL: 1 ♂, 7 ♀, Tugela and Mooi Rivers, 22-30.ix.53 (*A. D. Harrison*).

### *Pentaneura (Ablabesmyia) dusoleili* Goetghebuer

*Pelopia monilis* var. Kieffer, 1914, *Ann. S. Afr. Mus.* 10: 268.

*Ablabesmyia dusoleili* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27: 359.

*Pentaneura dusoleili* Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22: 128.

This species is extremely similar to the Palaearctic species *P. monilis* Linn., but there are hypopygial differences which suggest that the species are distinct. I have not examined the type, but I have seen material of the species, borrowed from the Musée Royal du Congo Belge, collected at the same time and place as the holotype but not studied by Goetghebuer. In addition, Dr. Benoit has very kindly confirmed the presence of wing markings in the holotype which Goetghebuer omitted in his figure of the wing.

It is a common and variable species, varying both in size and extent and darkness of the wing pattern. It can be separated in the typical form from all other African species known to me by the three black spots at the apices of  $R_1$ ,  $R_{2+3}$ , and  $R_{4+5}$ . The wings are strongly mottled, femora with a dark apical or subapical ring and often with a white ring basal to this; closely resembles *P. monilis*, but male coxites with pronounced basal rounded swelling, longest aedeagal process blunt ended (this is pointed in *monilis*), also the median internal strut is wider than in *monilis*.

*Male.* Wing length 2.0-3.5 mm.

*Head*, mouthparts and pedicel blackish brown, flagellum paler, A.R. about 2. *Thorax* with greyish brown stripes; shoulders, lines of bristles, prescutellar area heavily pruinose; bristles whitish; scutellum pale or dark brown, postnotum and pleura largely blackish. *Legs* very like those of *melaleuca* (Text-fig. 8, *d*), femora usually only dark at apex, or just below to apex, but sometimes basal two-thirds obscurely darkened as well, and then there is a white ring just basal to the apical dark band; tibiae either with three bands much as in *melaleuca*, or with an extra

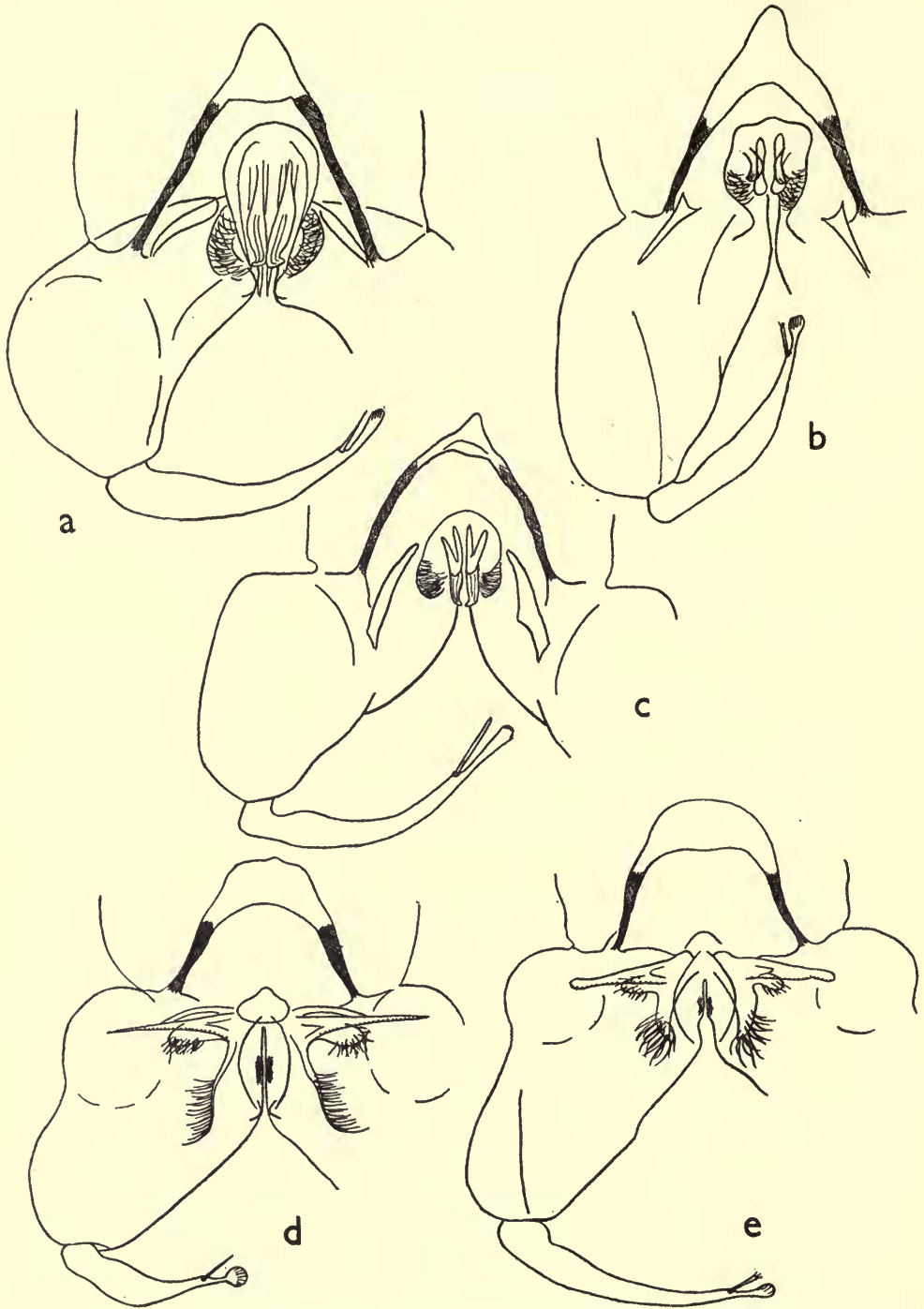


FIG. 10. Male hypopygia of *Pentaneura* (*Ablabesmyia*). (a) *P. nilotica*; (b) *P. appendiculata*; (c) *P. melaleuca*; (d) *P. pictipes*; (e) *P. dusoleili*.

small basal band as in *appendiculata* (Text-fig. 8, *b*), widths of all bands variable; basitarsus with a narrow band just basal to the middle and an apical black band, segments 2-4 black apically (as in Text-fig. 8, *b* of *appendiculata*). *Wings* (Text-fig. 9, *d* of female) with black markings on r-m cross-vein, posterior fork and apices of  $R_1$ ,  $R_{2+3}$ , and  $R_{4+5}$ ; remainder of wing markings variable but usually there are dark macrotrichia arranged more or less as shown; the large spot in cell  $R_{4+5}$  has quite a characteristic shape with an apical extension to its anterior edge. Halteres white. *Abdomen* with segments 1-5 white with some dark markings laterally on each segment, segments 6-7 dark, 8 and styles paler. Hypopygium (Text-fig. 10, *e*) with basal structures as shown, coxites with rounded basal prominence; the main arm of the basal structures is straight and blunt ended; styles with enlarged and fluted apex, bristle truncate and with three small hairs at apex.

*Female*. Very similar to male in pattern and colouring, except for the abdomen which is dark with the extreme apical margin paler; antennae either 12-segmented or with the basal flagellar segment indistinctly divided to make 13.

Holotype female in Musée Royal du Congo Belge; type locality BELGIAN CONGO, Uganda, Namasagali.

DISTRIBUTION. EGYPT: 3 ♀, Moascar, iii-iv.42 (*J. W. S. Macfie*). ANGLO-EGYPTIAN SUDAN: 1 ♀, nr. Assuan, 1923 (*S. Hirst*); 4 ♂, Khartoum, iv.1952 (*D. J. Lewis*); 21 ♀, Melut, Tonga and Shambe. 17-22.xi.53 (*E. T. M. Reid*). DAHOMEY: 1♀, Djougou, 28.v.54 (*J. Hamon*). ABYSSINIA: 2 ♀, Waldia, i.1936 (*J. W. S. Macfie*). KENYA: 1 ♂, Nairobi, iii.1924 (*van Someren*). BELGIAN CONGO: 3 ♀, Uganda, Namasagali, 16.iv.29 (*G. du Soleil*); 2 ♀, Elisabethville, 24.xii.38 (*H. J. Brédo*); 1 ♀, Kalondo (Kivu), viii.53. S. RHODESIA: 1 ♀, Salisbury, i.1900 (*G. A. K. Marshall*); 1 ♀, Melssetter ii.1929. TRANSVAAL: 1 ♀, Johannesburg, v.1930 (*B. de Meillon*). NATAL: 1 ♀, Estcourt, ix-x.1896 (*G. A. K. Marshall*); 1 ♀, Weenen, iii.1925 (*H. P. Thomasset*); 13 ♂, 2 ♀, Bushman's and Mooi Rivers, 22-30.ix.53 (*A. D. Harrison*). CAPE PROVINCE: Berg River, numerous examples (*K. M. F. Scott*).

### *Pentaneura (Ablabesmyia) dusoleili* ? var.

There are some specimens from South Africa which have wing markings and male hypopygium extremely similar to normal *dusoleili* but in which there are black spots at the tips of  $R_1$  and  $R_{4+5}$  only. These may be a distinct species or only a variety.

DISTRIBUTION. TRANSVAAL: 1 ♀, Kruger National Park, 6.v.51 (*Swedish S. Afr. Exp.*). NATAL: 1 ♂, 1 ♀, Estcourt, 22.ix.53, 1 ♀, Newcastle, 23.ix.53, 1 ♂, Colenso, 22.ix.53 (all coll. *A. D. Harrison*); 2 ♀, Ladismith, 4.i.51 (*Swedish S. Afr. Exp.*). CAPE PROVINCE: Berg River, series of both sexes (*K. M. F. Scott*).

### *Pentaneura (Ablabesmyia) pictipes* Kieffer

*Tanypus pictipes* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 194.

*Tanypus variiforceps* Kieffer, 1923, *Ibid.* 92 : 195 (SYN. NOV.).

*Tanypus marginatus* Kieffer, 1923, *Ibid.* 92 : 196 (SYN. NOV.).

*Tanypus reductus* Kieffer, 1923, *Ibid.* 92 : 196 (SYN. NOV.).

*Tanypus contracticornis* Kieffer, 1925, *Bull. Soc. R. ent. Egypte*, 1924 : 311 (SYN. NOV.).

This species differs from all others known to me from Africa by the short female antennae, which have 11 segments only. All the species mentioned in the synonymy were described from the Anglo-Egyptian Sudan or from Egypt, all were described as having only 11 segments in the female antennae, and the differences between them seem to be very superficial. I am therefore regarding them as redescriptions of the same species.

It is a small insect with black spots at the apices of  $R_1$  and  $R_{4+5}$  as well as at the cross-vein, male abdomen uniformly brown, longest aedeagal arm pointed.

*Male.* Wing length 1.3–1.6 mm.

*Head*, mouthparts brown, pedicel blackish, flagellum pale, A.R. 1.5. *Thorax* mottled with pruinosity, stripes blackish, scutellum pale, remainder dark. *Legs* ringed; femur with subapical dark ring and usually, though not always, traces of at least one ring or band on the basal half; tibiae with three rings only, as shown in Text-fig. of *melaleuca*; tarsal rings as in *appendiculata* (Text-fig. 8, *b*) but segment 4 only about one and a half times as long as 5. *Wings* (Text-fig. 8, *e*) rather blunt-ended and with black markings over r-m cross-vein, base of posterior fork and apices of  $R_1$  and  $R_{4+5}$ ; other markings due to black macrotrichia as shown in Text-figure; costa ending only a little beyond level of apex of  $M_{3+4}$ . Halteres white. *Abdomen* uniformly brown without white markings. Hypopygium (Text-fig. 10, *d*) with broad short coxites which are swollen basally; main arm of basal aedeagal structure pointed; apex of style disc-like and striated, bristle pointed, style itself short and bent.

*Female.* Antennae short, segments moniliform and 11 in number; remainder of insect very like the male.

The types of Kieffer's species all seem to be lost. *T. pictipes*, *variiforceps*, and *reductus* were all described from Anglo-Egyptian Sudan, Shambe; *marginatus* from Sudan, between Wad el Zaki and Shabasha Shary; *contracticornis* from Egypt, Cairo.

**DISTRIBUTION.** ANGLO-EGYPTIAN SUDAN: series of both sexes taken at light at Khartoum and Wad Medani, ii. 1952 (*D. J. Lewis*) and Melut, 17.xi.53 (*E. T. M. Reid*). KENYA: 1 ♂, Kisumu, 13.v.35 (*C. B. Symes*).

### Genus *ANATOPYNIA* Johannsen

*Anatopynia* Johannsen, 1905, *Bull. N. Y. State Mus.* 86: 135; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 297.

*Psectrotanypus* Kieffer, 1909, *Bull. Soc. Metz* 26, 42 nec Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 202 (see *Pentaneura cygnus*).

*Macropelopia* Thienemann, 1916, *Arch. Hydrobiol. Suppl.* 2: 497.

Wing membrane clothed with macrotrichia; costa strongly produced;  $R_2$  present and distinct; basal section of  $M_{3+4}$  present and posterior fork just basal to this as in *Pentaneura*; antennae of female 15-segmented; pulvilli present or absent.

Of the four African species known to me *schwetzi* and *marmorata* are similar to the Palaearctic species allied to *A. nebulosa* Meigen (group or subgenus *Macropelopia* Tnm.). The other two species are not so typical and have plain unmarked wings; they do not fall into the groups recognized by Edwards.



KEY TO AFRICAN SPECIES OF *Anatopynia*

- |   |                         |
|---|-------------------------|
| 1. Wings plain and unmarked . . . . .   | 2                       |
| Wings with patches of dark macrotrichia on the membrane . . . . .                   | 3                       |
| 2. Small blackish species (wing length 2 mm.); L.R. 0.75; pulvilli absent . . . . . | <i>unicolor</i> Freeman |
| Larger greenish species (wing length 3 mm.); L.R. 1.0; pulvilli present . . . . .   | <i>petersi</i> sp. n.   |
| 3. Wing pattern as in Text-fig. 11, a; knees broadly darkened . . . . .             | <i>schwetzi</i> sp. n.  |
| Wing pattern as in Text-fig. 11, b; knees hardly darkened . . . . .                 | <i>marmorata</i> sp. n. |

*Anatopynia schwetzi* sp. n.

A perfectly typical species of the genus, belonging to the group *Macropelopia*, separated from *A. marmorata* by the larger size and arrangement of dark macrotrichia in cell  $R_{4+5}$ ; knees broadly darkened, pulvilli absent.

*Male.* Wing length 4 mm.

*Head* brown, mouthparts and scape darkened, flagellum and plumes pale, A.R. 1.8. *Thorax* with blackish stripes, shoulders, lines of bristles and prescutellar area yellowish brown and pruinose, two patches of pruinosity just in front of scutellum are particularly conspicuous; prothorax, scutellum, postnotum yellowish brown, pleura blackish. *Legs* pale, knees broadly darkened, tips of tibiae also dark, anterior tibia one and a quarter times as long as femur, L.R. 0.6, pulvilli absent. *Wings* with dark macrotrichia arranged as in Text-fig. 11, a of the female, but pattern not so sharply defined; membrane stained in the areas shown shaded; costa produced,  $R_{2+3}$  ending beyond  $M_{3+4}$ . Halteres white. *Abdomen* brown, clothed with long hairs laterally and short ones dorsally, segments translucent, styles simple.

*Female.* Resembles male but wing pattern (Text-fig. 11, a) stronger, with staining beneath the dark macrotrichia, deeper where shaded; antennae with 15 segments.

Holotype male and 1 female paratype, BELGIAN CONGO, Ruanda Urundi (*J. Schwetzi*) in British Museum; 1 further female paratype UGANDA, Kabale, vii. 1932 (*G. H. E. Hopkins*).

*Anatopynia marmorata* sp. n.

Smaller than *schwetzi*; wings mottled, membrane more deeply stained beneath the dark macrotrichia; knees not strongly darkened;  $R_{2+3}$  ending above  $M_{3+4}$ .

*Male.* Wing length 3 mm.

*Head* and mouthparts brown, antennae paler, A.R. 1.5. *Thorax* brown, stripes outlined by pruinosity on shoulders and along lines of bristles. *Legs* pale yellowish, femora brown apically, tibiae slightly so basally, proportions of front legs as in *schwetzi* pulvilli absent. *Wings* (Text-fig. 11, b of female) marbled with patches of light and dark macrotrichia, membrane more heavily stained in the dark areas than it is in *schwetzi*;  $R_{2+3}$  ending at same level as apex of  $M_{3+4}$ . Halteres yellow. *Abdomen* with segments 1-4 whitish, with posterior third of each of segments 2-4 brown, terminal segments brown.

*Female.* Very similar to male, thorax darker, abdomen all brown; antennae 15-segmented.

Holotype female and 2 female paratypes, CAPE PROVINCE: Ceres, iv. 1925 (*R. E. Turner*) in British Museum. Other paratypes: CAPE PROVINCE: 1 ♂, Cape Tradower Pass, 4.i.51 and 1♀, "Cape" (*Swedish S. Afr. Exp.*).

*Anatopynia unicolor* Freeman

*Anatopynia unicolor* Freeman, 1954, *Proc. R. ent. Soc. Lond.* (B) 23 : 172.

This species was originally described from a single male in which the postnotal furrow was hardly visible. The Swedish South Africa Expedition collected a female which appears to correspond to the other sex. This female has 15-segmented antennae, and the postnotal furrow is better developed than in the male.

A small dark species without any markings on either wings or body ; postnotal furrow reduced, especially in the male ; pulvilli absent ; costa produced, r-m rather long.

*Male.* Wing length 2.0 mm.

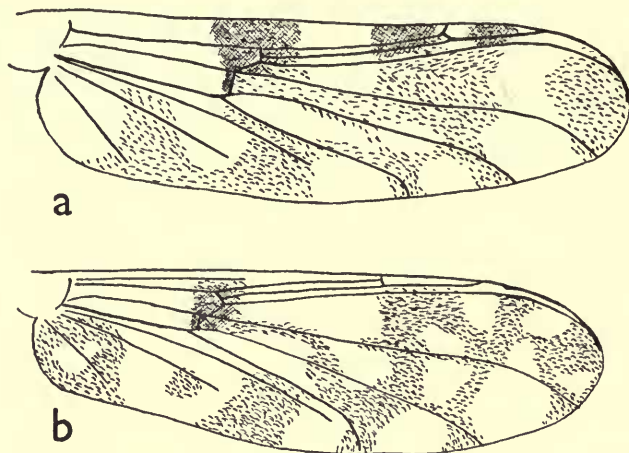


FIG. 11. Wings of female *Anatopynia*, only areas of dark macrotrichia shown. (a) *A. schwetzi* ; (b) *A. marmorata*.

*Head* blackish, palpi rather short, eyes bare, antennae with well developed plumes, A.R. 1.0. *Thorax* black, pruinose, prothorax not as large as in some species of *Anatopynia*, scutellum brown, postnotum in the only known male with reduced longitudinal furrow which is only just distinguishable under a high power. *Legs* brown, unmarked, L.R. 0.75, pulvilli absent, empodium well developed and long. *Wings* unmarked, densely covered with macrotrichia over most of their surface ; costa produced, reaching nearly half way to M,  $R_{2+3}$  well developed and forked, r-m long. Halteres yellow. *Abdomen* uniformly dark, hypopygium normal, styles simple, tapered and with a single apical spine.

*Female.* Very similar to the male in colour and wing venation ; antennae 15-segmented, postnotal furrow readily visible, L.R. 0.6.

Holotype male in British Museum.

*DISTRIBUTION.* CAPE PROVINCE : 1 ♂, Berg River, Assegaibos Waterfall, 23.xii.52 (K. M. F. Scott) (type locality) ; 1 ♀, Upper Berg River, 4.vii.51 (Swedish S. Afr. Exp.).

*Anatopynia petersi* sp. n.

This species is in some ways intermediate between *Anatopynia* and *Pentaneura*, but as the costa is strongly produced I have placed it in the former. The prothorax is rather reduced, but there seems to be no clear-cut distinction between the two genera in this character. When a female can be examined, the segmentation of the antennae may show more firmly into which genus it should really be placed.

Thorax greenish with yellow-brown markings, abdomen green, segments 2-5 with dark bands, L.R. 1.0, wings unmarked. Separated from *A. unicolor* by the larger size, paler colour, greater L.R. and presence of pulvilli.

*Male.* Wing length 3 mm.

*Head* green, palpi well developed, dark green; pedicel dark brown, A.R. 2.0. *Thorax* green with yellow-brown stripes, sternopleuron and postnotum; bristles long and brown; prothorax rather reduced for *Anatopynia*. *Legs* greenish, L.R. 1.0, pulvilli well developed. *Wings* clear and unmarked, fairly thickly clothed with macrotrichia; costa produced for about one third of distance to M. Halteres green. *Abdomen* green, segments 2-5 with a pale brown transverse band in the basal half, apical segments darker; bristles long and dark. Hypopygium with simple coxites and styles; coxites with two inner denser patches of setae, styles flattened in apical half, with well developed setae and an apical spine which is longer and thinner than usual.

*Female.* Not known.

Holotype male, TANGANYIKA: Njombe, 6-6,500 ft., 7.1.52 (*W. Peters*) in British Museum. Paratype, BELGIAN CONGO: 1 ♂, Elizabethville, 17.xii.38 (*H. J. Brédo*) in Institut Royal des Sciences Naturelles de Belgique.

Genus *TANYPUS* Meigen.

*Tanypus* Meigen, 1803, *Illiger's Mag.*, 2: 261; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 299; Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27: 353.

*Protenthes* Johannsen, 1907, *Ent. News* 18: 400; Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 187.

*Trichotanypus* Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or., Ins. Dipt.* 1: 13 (nec Kieffer, 1906, *Ann. Soc. sci. Brux.* 30: 319).

I am using this genus in the sense used by Edwards and Goetghebuer. As there is some confusion as to which of the originally included species should be considered as the type of the genus it is probable that the International Commission on Zoological Nomenclature should be asked to pronounce an Opinion placing *Tanypus* on the Official list of generic names.

Wings with macrotrichia on the membrane, costa produced, posterior fork distal to base of  $M_{3+4}$ , but this distance less than one-third as long as  $Cu_1$ . Pronotum conspicuous, mesonotum without acrostichal bristles but with an oval sharply defined tubercle at the end of the median stripe and immediately before the prescutellar area; this tubercle is pubescent in the African species. Fourth tarsal segment cylindrical, pulvilli absent. Female antennae 13-15-segmented.

Kieffer and Goetghebuer have described five species and one variety belonging to this genus. I have been able to recognize all of these in the collections at my disposal.

Two of Goetghebuer's species are synonyms of species earlier described by Kieffer, and I have raised the variety to the rank of species; no new species are known to me from Africa.

All the four species which I am recognizing are quite typical members of the genus and resemble *Tanypus punctipennis* Meigen, the Palaearctic species which is the type of the genus according to Edwards.

#### KEY TO AFRICAN SPECIES OF *Tanypus*

1. Thorax reddish brown dorsally with lateral margins broadly yellow or creamy; female antennae with 13 segments . . . . . *brevipalpis* Kieffer  
Thorax fairly uniformly dark brown or blackish without pale margin . . . . . 2
2. Wing spots extended and coalesced (Pl. I, fig. d); a small dark species; no row of spots along costa; female antenna with 14 segments . . . . . *fuscus* nom. nov.  
Wing spots more discrete; costa with row of spots; female antenna with 15 segments 3
3. Posterior fork cell clear at the base (Pl. I, fig. b), r-m usually with slight darkening only . . . . . *guttatipennis* Goetghebuer  
Fork cell clouded basally (Pl. I, fig. a), r-m with large cloud . . . . . *lacustris* Kieffer

#### *Tanypus lacustris* Kieffer

*Trichotanypus lacustris* Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1: 13.

*Tanypus maculosipennis* Goetghebuer, 1934, *Rev. Zool. Bot. Afr.* 25: 194 (syn. nov.).

Wings heavily spotted, tendency for spots to coalesce at level of apex of  $R_{2+3}$  and around cross-vein; anterior wing margin with six or seven well marked black spots, posterior fork with spot at base often filling base; palpi short but segments twice as long as broad; thorax brownish black.

This species is very similar to *guttatipennis*, in fact the latter may be only a pale form of it. It seems best separated by the presence of a dark spot at the base of the posterior fork; this spot is variable in size, as are most of the other spots.

*Male.* Wing length 2.75 mm.

*Head* brown, mouthparts reduced but larger than in *brevipalpis*; palpi with segments about twice as long as broad; antennae brown, pedicel blackish, A.R. 1.75. *Thorax* brownish black, scutellum paler and with a dark line down its centre, mesonotal stripes indicated by pruinosity. *Legs* pale, femora with two dark rings, one at the apex and one below separated by a pale ring; tibiae dark basally and more narrowly at the apex; each tarsal segment dark at the apex; L.R. 0.8, anterior tarsi bearded. *Wings* with pattern of spots similar to female (Pl. I, fig. a), but spots not so large; spots at level of  $R_{2+3}$  and r-m have a tendency to fuse or at any rate are larger, costal margin with 6-7 spots, posterior fork with a spot in the basal angle which often includes a pale area. Halteres brown. Abdomen blackish brown, segments paler at their apices.

*Female.* Similar to the male but wing markings more intense and spots blacker (Pl. I, fig. a); antennae with 15 segments.

I have examined the series of cotypes of *T. lacustris* in Muséum National d'Histoire Naturelle, Paris; type locality, KENYA, Naivasha. I have not seen the type of *T. maculosipennis* which is in Musée Royal du Congo Belge.



DISTRIBUTION. UGANDA: 1 ♀, Kampala, 21.v.26 (*G. L. R. Hancock*); 1 ♂, Kampala, 24.xi.27 (*H. Hargreaves*); 4 ♂, 3 ♀, L. Victoria (*W. W. Macdonald*). KENYA: series of cotypes, Naivasha (*Alluaud & Jeannel*); 3 ♂, 2 ♀, Nairobi, vii.1924 (*van Someren*). NIGERIA: 1 ♀, Ibadan, 12.vii.13 (*W. A. Lamborn*). FRENCH W. AFRICA: 1 ♂, Haute Volta, Bobo-Dioulassa, 30.iii.54 (*J. Hamon*). BELGIAN CONGO: 1 ♂, 10 ♀, Kivu, Kalondo, viii.1935 (*H. Damas*). NYASALAND: 1 ♀, Zomba (*H. S. Stannus*). NATAL: 1 ♂, 1 ♀, Bushman's River, Estcourt, 22.ix.53 (*A. D. Harrison*).

*Tanypus guttatipennis* Goetghebuer

*Tanypus guttatipennis* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* **27**: 354.

This species differs from *T. lacustris* only in the wing markings (Pl. I, fig. b). The spots are more discrete and there is less tendency for fusion; those along the costal margin are less dark, there is usually much less darkening around the cross-vein and the base of the posterior fork is quite clear. Goetghebuer is not correct in stating that the tibiae have no dark markings, in fact they resemble *lacustris*. The species may simply be a pale form of *lacustris*.

I have not seen the holotype which is in Musée Royal du Congo Belge (type locality, BELGIAN CONGO, Parc National Albert, Vitshumbi).

DISTRIBUTION. UGANDA: 5 ♂, 6 ♀, L. Victoria, v-vi.52 (*W. W. Macdonald*). BELGIAN CONGO: 6 ♂, 26 ♀, Parc National Albert (*G. F. de Witte & H. Damas*); 1 ♀, Elisabethville, i.1933 (*C. Seydl*). TRANSVAAL: 1 ♀, Harrismith, iii.1927 (*R. E. Turner*); 1 ♂, Johannesburg, iii.1930 (*B. de Meillon*). NATAL: 3 ♀, Weenen, ix-x.28 (*H. P. Thomasset*). CAPE PROVINCE: 1 ♀, Deelfontein, x.1902 (*Sloggett*); 7 ♀, Ladismith, 4.i.51 (*Swedish S. Afr. Exp.*); 3 ♂, 3 ♀, Tulbagh, 29.x.53 (*K. M. F. Scott*).

*Tanypus brevipalpis* Kieffer

*Protenthes brevipalpis* Kieffer, 1923, *Ann. Soc. ent. Fr.* **92**: 187.

*Tanypus dewulfi* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* **27**: 353 (SYN. NOV.).

Easily distinguished from the other African species by the pale reddish brown thorax broadly margined with yellow or yellowish white, and by the complete absence of spots along the costal margin of the wing; mouthparts very short, female antenna with only 13 segments.

*Male*. Wing length 2-2.5 mm.

*Head* brown, mouthparts much reduced, palpal segments about as long as wide, pedicel blackish, plumes dark, A.R. 2.5. *Thorax* with pale reddish brown mesonotal stripes which are fused; shoulders and lateral margins broadly margined with yellow or yellowish white; upper half of pleura whitish, lower half and postnotum dark brown. *Legs* with markings very similar to *lacustris* but dark markings on femora and tibiae much less distinct. *Wings* with dark spots arranged as in female (Pl. I, fig. c), but spots variable and tend to be smaller in the male; costal margin always lacking spots except for a slight darkening at the apex of R<sub>1</sub>, usually clearer than in the female; r-m cross-vein with slight clouding, posterior fork more or less

as shown for female. Halteres with dark knobs. *Abdomen* uniformly blackish brown.

*Female*. Resembles male in body colour and legs; wings as in Pl. I, fig. c, exact size of spots somewhat variable, especially the double row in cell  $R_{4+5}$ . Antennae with only 13 segments.

I have not seen the type of either *brevipalpis* which seems to be lost (type locality, A.E. SUDAN, Shambe), or of *dewulfi* which is in Musée Royal du Congo Belge (type locality, BELGIAN CONGO, Parc National Albert, Vitshumbi).

DISTRIBUTION. ANGLO-EGYPTIAN SUDAN: 30 ♂, 17 ♀, Yirol ii.54 (E. T. M. Reid). BELGIAN CONGO: Parc National Albert, long series of both sexes (G. F. de Witte & H. Damas). TANGANYIKA: 5 ♀, Shinyanga (E. Burt).

### *Tanypus fuscus* nom. nov.

*Protenthes brevipalpis* var. *obscurus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 189 (nec *Tanypus obscurus* Macquart, 1926, *Rec. Soc. Sci. Agric. Lille*: 189).

This seems to be a distinct species, not only because of the 14-segmented antennae of the female and dark colour, but also because the central thoracic tubercle is much larger than in the other three species.

*Female*. Wing length 2.25 mm.

*Head* dark, mouthparts very short, antennae with 14 segments. *Thorax* blackish brown with some pruinosity, median tubercle unusually large and with a central depression. *Legs* dark, tarsi paler, markings as in *lacustris* but not as easy to distinguish. *Wings* (Pl. I, fig. c) with markings basically similar to *brevipalpis* but spots are larger and several have coalesced. Halteres blackish. *Abdomen* black.

*Male*. Not known.

The type is probably lost. Type locality, ANGLO-EGYPTIAN SUDAN, Shambe.

DISTRIBUTION. ANGLO-EGYPTIAN SUDAN: 1 ♀, Melut, 17.xi.53 (E. T. M. Reid).

### Genus *COELOTANYPUS* Kieffer

*Coelotanypus* Kieffer, 1913, *Rec. Ind. Mus.* 9: 154; Edwards, 1931, *Dipt. Pat. S. Chile*, 2: 237.

Wing membrane bare, posterior fork either opposite base of  $M_{3+4}$  or stem only one sixth length of  $Cu_1$ , vein  $R_2$  present but not distinctly connected to  $R_{2+3}$ . Mesonotum with acrostichal hairs present in the African species; median stripe with oval tubercle immediately before prescutellar area as in *Tanypus*. Fourth tarsal segment more or less cordiform.

*Coelotanypus* shows some degree of resemblance to *Tanypus* because of the presence of the median thoracic tubercle and short or missing stem to posterior fork. It is, however, much closer to *Clinotanypus* in its general appearance and structure. Since one species of *Clinotanypus* has now been found with a central thoracic tubercle, it seems that the only difference left is the length of the stem of the posterior fork. The genus is typically Neotropical and Nearctic in distribution, the following species being the only one so far known outside these two Regions. It is, therefore, convenient to leave the two genera distinct for the present.

*Coelotanypus africanus* sp. n.

Thorax reddish, wings hyaline, posterior fork opposite base of  $M_{3+4}$ , legs yellow, tips of tibiae dark, abdomen with segments 1-5 mainly pale in the male.

*Male.* Wing length 3.25 mm.

*Head* yellowish brown, very transverse when seen from the front, mouthparts fully developed, antennae brown, plumes pale, A.R. nearly 4. *Thorax* fairly uniformly reddish brown, shoulders creamy, postnotum and prescutellar area darker brown; acrostichal bristles present, but short and pale, diverging around prescutellar

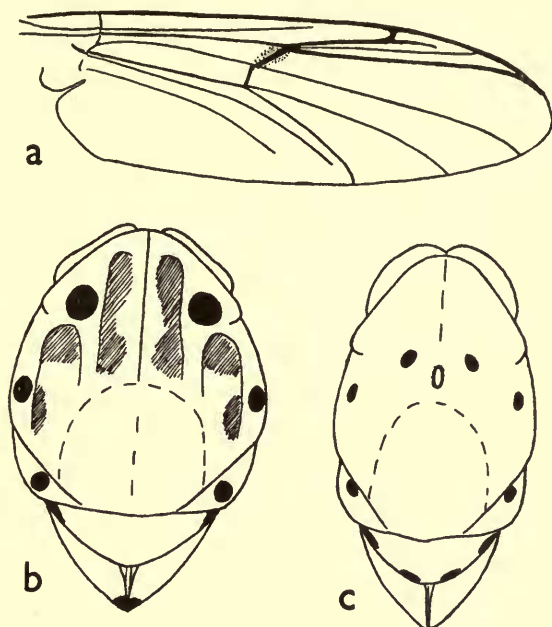


FIG. 12. *Coelotanypus* and *Clinotanypus*. (a) wing of female *Coelotanypus africanus*; (b) dorsal view of thorax of a typical male *Clinotanyups claripennis*; (c) the same of female *Cl. maculatus*.

area, which is sharply marked off and sunken. *Legs* yellow, tips of tibiae darkened, tarsal segments 3-5 brown, segment 4 bilobed and more or less heart-shaped, pulvilli absent. *Wings* quite clear and unmarked except for a slight darkening at r-m cross-vein, veins otherwise pale;  $R_{2+3}$  distinct (Text-fig. 12, a),  $R_2$  present, but disconnected basally, costa produced, r-m cross-vein rather long, base of  $M_{3+4}$  slightly basal to it, posterior fork exactly opposite base of  $M_{3+4}$ . Halteres yellow. *Abdomen* with segments 1-5 pale, yellowish, segments 3-5 with basal halves brown, segments 6-7 brown, 8 paler.

*Female.* Quite similar to male but more uniformly yellowish brown, darker thoracic markings much more restricted, abdomen yellowish brown with pale margins to segments. Antennae with 14 segments.

Holotype male, SIERRA LEONE, Batkanu, 21.ii.11 (*H. E. Arbuckle*) in British

Museum. Paratypes : NIGERIA : 1 ♂, Cameroons, Johann Albrechtshöhe, 15.iv.96 (*L. Conradt*). FRENCH CAMEROONS : 1 ♀, Mao Godi, vi.1909 (*Riggenbach*). Both paratypes are in Zoologisches Museum der Universität, Berlin.

### Genus *CLINOTANYPUS* Kieffer

*Clinotanypus* Kieffer, 1913, *Rec. Ind. Mus.* 9 : 157 ; Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 186 ; Edwards, 1929, *Trans. ent. Soc. Lond.* 77 : 302 ; Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 351.

Wings bare, costa produced,  $R_2$  present but disconnected basally and appearing as a free branch of  $R_1$ , posterior fork distal to true base of  $M_{3+4}$ . Female antennae with 14 segments (Kieffer states 13-segmented in *C. claripennis* q.v.). Fourth tarsal segment bilobed and cordiform.

Four species belonging to this genus have been described by Kieffer and Goetghebuer, but all of them appear to be descriptions of the same species.

Kieffer originally separated *Coelotanypus* and *Clinotanypus* by the presence or absence of a stem to the posterior fork. Edwards (1931) further separated them by the presence or absence of a median mesonotal tubercle. However this tubercle is present in the African species *Clinotanypus maculatus* which has a stalked fork. The two genera are obviously very closely allied, but as stated under *Coelotanypus*, it is convenient to keep them separate until more species have been described and the limits and distribution of the genera more fully explored.

#### KEY TO AFRICAN SPECIES OF *Clinotanypus*

1. Mesonotum mainly black and without separate stripes . . . . . 2  
     Mesonotum with yellow or reddish background, with or without dark markings,  
     stripes separate . . . . . 3
2. Wings without well developed clouds ; acrostichal and dorso-central bristles and  
     their pits small and inconspicuous . . . . . *lacteus* sp. n.  
     Wings with brown markings ; thoracic bristles arising from large pits, giving surface  
     a rugose appearance, especially in prescutellar area . . . . . *rugosus* sp. n.
3. Acrostichal and dorso-central bristles small, pale and inconspicuous, no median  
     mesonotal tubercle, female thorax without black markings . . . . . *claripennis* Kieffer  
     Bristles strong, dark brown and very distinct, median tubercle present, thorax in both  
     sexes with ten black spots arranged in a circle around the prescutellar area  
     . . . . . *maculatus* Freeman

### *Clinotanypus claripennis* Kieffer

*Clinotanypus claripennis* Kieffer, 1918, *Ann. Mus. Nat. Hung.* 16, 63.

*Clinotanypus niligenus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 186 (SYN. NOV.).

*Clinotanypus nigripalpis* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 351.

*Clinotanypus nigrovittatus* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 352.

A common and variable species, which seems to occur over most of Africa south of the Sahara, except in the Guinean Forest, and also northwards into Israel. The important features which distinguish the male from the other species are the four round black spots in front of and at the side of the lateral stripes ; the stripes in this sex vary from almost entirely black to yellowish, the abdomen is yellow with black



transverse markings, legs yellow with a variable amount of darkening. The female is a large stout insect for the subfamily, with red thoracic stripes, dark abdomen and 14-segmented antennae.

In his description of *C. claripennis*, Kieffer says that the antennae are 13-segmented, but an examination of a female cotype kindly lent by Dr. Mihalyi shows there to be 14 segments present, and enables me to synonymize the later names.

*Male.* Wing length 2.5–4.0 mm.

*Head* yellowish, very transverse (Text-fig. 1, *a*), mouthparts fully developed, palpi brown, antennae brown, A.R. about 3.5. *Thorax* with yellow or creamy background; stripes reddish with a variable amount of black (Text-fig. 12, *b*), black markings especially prominent at posterior end of median stripe and anterior ends of lateral stripes, sometimes stripes almost completely black; in addition there are circular black spots on the shoulders, laterally and above the wing base. Basal angles of scutellum and apex of postnotum usually black; postnotum and sternopleuron may be mainly black. Acrostichal and dorso-central bristles small and inconspicuous, median tubercle absent, acrostichal bristles traversing prescutellar area. *Legs* variable in colour; in dark specimens femora and tibiae brown, tibiae with a paler band in apical half, tarsi yellow, segments 2–5 of anterior legs and 3 or 4–5 of posterior legs brown; in pale specimens, legs yellow with tips of tibiae and segments 4–5 of tarsi darkened. *Wings* (Pl. I, fig. *e* of female) hyaline and with a circular cloud over r-m cross-vein, venation normal. Halteres yellowish or brownish. *Abdomen* yellow, segment 1 with slight darkenings laterally, segments 2, 3 and 4 with median transverse narrow dark bands and basal triangular dark spots, segments 5–8 with apical, dark, transverse bands.

*Female.* Rather different in appearance from male. *Head* (Text-fig. 1, *b*) similarly very transverse, eyes reniform and without such a long dorsal process as in the male, antennae 14-segmented. *Thorax* without black markings, either uniformly reddish, or yellow with reddish or brownish stripes, bristles similarly small, pale and inconspicuous. *Legs* similar to male. *Wings* (Pl. I, fig. *e*) often rather darker, especially anteriorly, but without definite clouds except over r-m. Halteres brown. *Abdomen* stout, uniformly blackish or very dark brown, with pale hairs.

I have been able to borrow a cotype female from the Hungarian National Museum, type locality, EGYPT Ismalia. The type of *niligenus* is probably lost, type locality ANGLO-EGYPTIAN SUDAN, Shambe. I have not seen the types of *nigripalpis* and *nigrovittatus* which are in Musée Royal du Congo Belge (type locality of both, BELGIAN CONGO, Parc National Albert, Vitshumbi).

**DISTRIBUTION.** ISRAEL: 2 ♂, Galilee (*O. Theodor*). ANGLO-EGYPTIAN SUDAN: 10 ♀, between Tonga and Shambe, xi.1953 and 2 ♂, 2 ♀, Yirol, iii.1954 (*E. T. M. Reid*). FRENCH SUDAN: 2 ♂, Macina. NIGERIA: 1 ♀, Afikpo, 2.vi.10 (*J. J. Simpson*); 1 ♂, Gadau, 18.iii.33 (*D. J. Lewis*). UGANDA: 1 ♂, Nambadyidza Forest, 24.xi.29 (*G. H. E. Hopkins*); 1 ♀, Entebbe, 13.xii.34 (*F. W. Edwards*); 2 ♂, L. Victoria, 7.viii.51 (*W. W. Macdonald*). KENYA: 3 ♀, Kisumu, 5.vii.35 (*C. B. Symes*). BELGIAN CONGO: 2 ♀, Ituri (*A. Collart*); 1 ♀, Mulongo (Mafinge), vii.1930 (*P. Gérard*); 11 ♀, Musosa, ix–xi.39 (*H. Brédo*); long series of both sexes from Parcs Nationaux Albert and Upemba. NYASALAND: 1 ♂, Luchenza, Makandi,

14.v.11 (*F. G. Evans*); 1 ♀, Langenburg. N. RHODESIA: series of 30 damaged specimens, Lake Bangweulu, ix-xii.46 (*M. Steele*). S. W. AFRICA: 5 ♀, Kaokoveldt, Ohopoho, vi.51 (*Swedish S. Afr. Exp.*). ORANGE FREE STATE: 1 ♂, 1 ♀, Harrismith ii-iii.27 (*R. E. Turner*). NATAL: 1 ♂, iii-iv.24 and 2 ♀, ix-x.28 (*H. P. Thomasset*).

### *Clinotanypus maculatus* Freeman

*Clinotanypus maculatus* Freeman, 1955, *Explor. Parc Nat. Upemba*, Miss. G. F. de Witte, fasc. 35: 92.

A yellow insect with 10 small black spots on the thorax forming a circle around the prescutellar area. Easily separated from *C. claripennis* by the thoracic pattern, by the stronger and darker thoracic bristles and by the presence of a central oval mesonotal tubercle.

*Male*. Wing length 2.5 mm.

*Head* yellow, eyes with narrow dorsal portions, palpi brown; antennae yellowish brown, A.R. nearly 4, plumes yellow on basal two thirds, grey on apical third. *Thorax* with reddish yellow stripes on a whitish yellow background, bristles numerous and black, stronger than in *claripennis*, postnotum and sternopleuron reddish yellow; central mesonotal tubercle present, as in *Coelotanypus*, bearing a small tuft of black bristles. There are 10 small round black spots (Text-fig. 12, *c* of female) arranged as follows: four in an arc across middle of mesonotum, one above each wing base, one at each lateral angle of scutellum and two close together at apex of scutellum; seen from above the spots are in a circle enclosing the prescutellar area. *Legs* pale, whitish yellow, tips of anterior femora, tips of all tibiae, tips of basal three tarsal segments, and whole of tarsal segments 4 and 5, dark. *Wings* quite hyaline, except for a blackened cross-vein, venation normal, halteres pale. *Abdomen* yellow and with three longitudinal rows of small black spots, one placed centrally and one along each lateral margin; all spots near bases of segments, central ones the larger; spots best developed on segments 3-6, more or less obsolete on others. Abdominal hairs pale, except on spots where they may be darker.

*Female*. Wing length 2.5-2.75 mm.

Very similar to male (Text-fig. 12, *c* of thorax), thoracic background less white, so stripes less distinct, abdominal spots may be obsolete in some specimens.

Holotype female, in collections of the Institut des Parcs Nationaux du Congo Belge.

DISTRIBUTION. BELGIAN CONGO: 1 ♀, Lac Upemba, Mabwe, viii.47 (*G. F. de Witte*)—holotype; 1 ♀, Stanleyville, vii.1928 (*A. Collart*)—paratype. DAHOMEY: 3 ♂, 2 ♀, Porto Novo, Tove, xii.1954 (*J. Hamon*).

### *Clinotanypus lacteus* sp. n.

A blackish species with prothorax and pleural membrane of male milk white, of female shimmering; mesonotum shining and without tubercle, bristles and their pits small and inconspicuous; wings clear.

*Male*. Wing length 3.0 mm.

*Head* brown, mouthparts normal, palpi dark, antennae brown, plumes blackish, A.R. about 2.5. *Thorax* with shining black mesonotum; shoulders with diagonal yellow markings, stripes just indicated by browner areas along lines of bristles which are small, pale and inconspicuous, pits also small; prothorax and pleural membrane strikingly milk white, scutellum, postnotum and sternopleuron black; no sign of a median tubercle. *Legs*: in the holotype, basal third of femora yellowish, remainder black; tibiae black, middle and posterior ones with a broad median brown area; tarsi black, basitarsus mainly whitish; in the paratype male, femora only darkened apically. *Wings* clear and unclouded except for a slight smokiness towards the costa. Halteres with yellow knobs and darker stems. *Abdomen* black and with mainly black hairs, segments 1-5 with brown or yellowish areas each side at the base, hypopygium brown or yellow.

*Female*. Quite similar to male, thorax shining, stripes better indicated, bristles and pits inconspicuous; prothorax and pleural membrane shimmering only, not milk white. Antennae with 14 segments; legs mainly dark, basitarsus mainly whitish.

Holotype male, BELGIAN CONGO, Ruanda Urundi (*J. Schwetz*) in British Museum. Paratypes: 1 ♂, NIGERIA, Oshogbu, 11.x.10; 1 ♀, HAUTE VOLTA, Guena Bobo, 26.vi.53 (*J. Hamon*).

### *Clinotanypus rugosus* sp. n.

Distinguished from the female of *C. lacteus* by the large size of the pits of the mesonotal bristles, by the presence of definite wing markings and by the rather different leg markings.

*Female*. Wing length 2.0 mm.

*Head* brown, palpi darker, antennae pale, with 14 segments. *Thorax*: mesonotum black, not so strongly shining as in *lacteus*, shoulders hardly paler, bristles small and pale, but their pits very large, giving shoulders and scutellar area a rugose appearance; prothorax and pleural membrane with a greyish shimmer, probably due to the microtrichia; scutellum, postnotum and sternopleuron black. *Legs* black and white; femora black; tibiae black, anterior pair white on apical half, posterior pair with a white ring just below the middle; anterior tarsi black with basitarsus mainly white, other tarsi white except for segments 4 and 5. *Wings* (Pl. I, fig. f) mainly dark but with tips clear. Halteres dark. *Abdomen* blackish brown, paler beneath, hairs pale.

*Male* not known.

Holotype female, SIERRA LEONE, Njala, 21.vi.32 (*E. Hargreaves*) in British Museum. Paratypes, 1 ♀, NIGERIA, Zungeru, 15.xi.10 (*J. W. S. Macfie*). SUDAN: 1 ♀, Amadi, vi.54 (*E. T. M. Reid*).

There is a single female in the collections of Institut des Parcs Nationaux du Congo Belge from Parc National Albert which may belong to this species, but the apex of the wing is slightly clouded and there is a subapical darker area. It is possible that the wing markings are variable.

Genus *PROCLADIUS* Skuse

*Procladius* Skuse, 1889, *Proc. Linn. Soc. N. S. Wales* (2) 4 : 283 ; Edwards, 1929, *Trans. ent. Soc. Lond.* 77 : 300.

*Trichotanypus* Kieffer, 1918, *Ann. Mus. nat. Hung.* 16 : 62 ; Kieffer 1923, *Ann. Soc. ent.* 92 : 189 ; Kieffer, 1925, *Bull. Soc. R. ent. Egypte*, 1924 : 309 ; Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 355 (nec Kieffer, 1906, *Ann. Soc. sci. Brux.* 30 : 319—see Podominae).

*Psilotanypus* Kieffer, 1906, *Genera Insect.* 42 : 34.

I am following Edwards (1929) in his use of this genus to include both hairy and bare winged species. Those with macrotrichia on the membrane are placed in the subgenus *Procladius* sens. str., those with bare membrane are placed in *Psilotanypus*. I have material of six species including one of *Psilotanypus*.

The genus may be defined : Wings hairy or bare, costa produced,  $R_2$  present and very distinct, stem of posterior fork more than half as long as  $Cu_1$ . Female antenna with 13–14 segments. Pronotum well developed, hairy above. Fourth tarsal segment on all legs cylindrical, no pulvilli.

Kieffer and Goetghebuer have described seven species between them, but several of these appear to be synonyms. Five of the species are clear cut but the sixth may be a complex of two or more closely allied species. It is variable in size, colour and hairiness and seems to represent the Palaearctic species *P. choreus* Meigen. I am using the first name applied to it by Goetghebuer (*brevipetiolatus*), but it is quite possible that further collecting will show that two or more species are present.

KEY TO AFRICAN SPECIES OF *Procladius*

- |   |           |                                    |
|---|-----------|------------------------------------|
| 1. Wing membrane lacking macrotrichia (subg. <i>Psilotanypus</i> )  | . . . . . | <i>reidi</i> sp. n.                |
| Wing membrane with macrotrichia, at least apically (subg. <i>Procladius</i> )                                     | . . . . . | 2                                  |
| 2. General body colour blackish brown   | . . . . . | 3                                  |
| General body colour yellowish or pale brown   | . . . . . | 5                                  |
| 3. Macrotrichia confined to a triangular area at the apex of cell $R_{4+5}$                                       | . . . . . | <i>apicalis</i> Kieffer            |
| Macrotrichia present over most of wing surface  | . . . . . | 4                                  |
| 4. Basitarsus white, wings with pattern of scale-like macrotrichia  | . . . . . | <i>albitarsus</i> sp. n.           |
| Basitarsus and tibiae yellowish brown, wings usually with an apical or subapical shadow but without scale pattern | . . . . . | <i>brevipetiolatus</i> Goetghebuer |
| 5. Wings with subapical transverse row of spots (Pl. I, fig. k)   | . . . . . | <i>maculosus</i> sp. n.            |
| Wings with subapical dark shadow  | . . . . . | 6                                  |
| 6. Wings with a black spot over $R_2$ (Pl. I, fig. j)   | . . . . . | <i>polytomus</i> Kieffer           |
| Wings without this spot (Pl. I, fig. i)   | . . . . . | <i>noctivagus</i> Kieffer          |

*Procladius (Procladius) brevipetiolatus* Goetghebuer

*Trichotanypus brevipetiolatus* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 355 ; Freeman, 1953, *Proc. R. ent. Soc. Lond.* (B) 22 : 129.

*Trichotanypus umbrosus* Goetghebuer, 1935, *Rev. Zool. Bot. Afr.* 27 : 356 (SYN. NOV.).

Goetghebuer separated his two species mainly on two characters, firstly on the presence of a dark shadow on the wing of *umbrosus* and secondly on the shorter stem to the posterior fork of *brevipetiolatus*. Whilst it is possible to find specimens to fit these two extremes, there is so much variability in size, colour, and hairiness that I have found it impossible to maintain the distinction. There are series in the British



Museum of larger specimens with wings densely clothed with dark macrotrichia ; in these the wing membrane is nearly clear, but there are traces of brown staining which can be found by varying the light. There is a complete gradation from such specimens to others with quite heavily marked wings and small in size.

This species seems to be the African representative of *P. choreus* Meigen from which it can be separated by the much smaller outer lobe of the male style.

*Male.* Wing length 2.0-3.0 mm.

*Head* brown, pedicel and palpi darker, A.R. about 2. *Thorax* with dark grey or blackish stripes separated by pruinosity along the lines of the dorso-central bristles and in the prescutellar area ; shoulders, pleural membrane and scutellum yellow or brownish, postnotum and sternopleuron dark. *Legs* brownish yellow, femora may be darker ; tips of tibiae and segments 2-5 of tarsi dark ; L.R. 0.75.

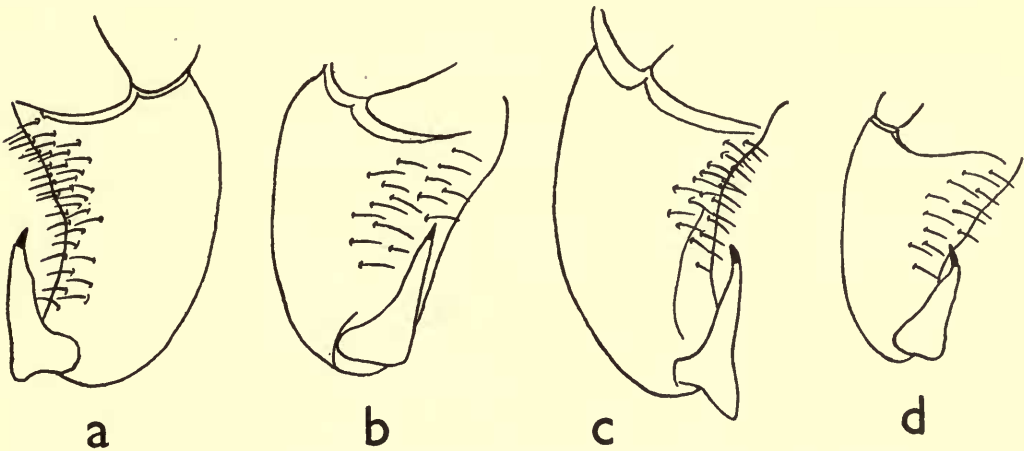


FIG. 13. Male hypopygia of *Procladius*. (a) *P. brevipetiolatus* ; (b) *P. albitalus* ; (c) *P. noctivagus* ; (d) *P. polytomus*.

*Wings* with normal venation as in Pl. I, fig. g of female ; membrane thickly clothed with macrotrichia, which may be all dark and then the membrane is hardly stained beneath, or the membrane may show staining as in the figure with dark macrotrichia over the staining and pale macrotrichia elsewhere ; cross-vein always clouded. Halteres usually yellow, occasionally brown. *Abdomen* dark brown with pale apical bands on segments 1-5 ; pale bands may occupy one third or one half of segments. Hypopygium (Text-fig. 13, a) with simple style, outer lobe short ; style variable in exact shape, may be broader than shown.

*Female.* Very similar to male. Antennae with 13 segments, though basal flagellar segment sometimes indistinctly divided. Wings more thickly clothed with macrotrichia, staining usually visible and darker than in the male. Abdomen with narrow pale rings apically on segments 1-7.

I have not seen the type specimens of either of Goetghebuer's species which are in Musée Royal du Congo Belge. Type locality of *brevipetiolatus*, BELGIAN CONGO, Parc National Albert, Vitshumbi ; of *umbrosus*, BELGIAN CONGO, Cratère Muyunga.

DISTRIBUTION. UGANDA: Entebbe, numerous specimens of both sexes, viii.51 (*W. W. Macdonald*); 1 ♂, Bwamba, Hakitengya, iv.1948 (*W. R. Lumsden*). KENYA: 3 ♂, 2 ♀, Nairobi (*van Someren*); 3 ♀, Kabete, xi.1913 (*T. J. Anderson*); 1 ♂, Naivasha, 4.v.18 (*T. J. Anderson*); 1 ♂, Kiambu, i.1933 (*Symes & Hopkins*); 4 ♂, 1 ♀, Kisumu (*C. B. Symes*). BELGIAN CONGO: numerous specimens from Parc National Albert (*de Witte & Damas*). NYASALAND: 1 ♂, Dowa Distr. (*J. B. Davey*). BECHUANALAND: 4 ♂, 34 ♀, Kalahari, Gemsbok Park, 16.xi.50 (*Swedish S. Afr. Exp.*). S. W. AFRICA: 1 ♂, 2 ♀, Kaokoveldt, Ohopoho, 4.vi.51 (*Swedish S. Afr. Exp.*). NATAL: 1 ♀, Weenen ix-x.28 (*H. P. Thomasset*); 1 ♀, Eshowe, ix.1930 and 2 ♂, 2 ♀, iii-iv.35 (*B. de Meillon*); 3 ♂, 3 ♀, Newcastle, ix.1953 (*A. D. Harrison*). CAPE PROVINCE: numerous specimens, Berg River (*K. M. F. Scott*); 1 ♀, Ceres, iii.1935 (*R. E. Turner*).

### *Procladius (Procladius) apicalis* Kieffer

*Trichotanypus apicalis* Kieffer, 1918, *Ann. Mus. nat. Hung.* 16: 62.

This species was described from two males from Pretoria, Natal. I have seen material agreeing with the description and have been able to borrow a cotype from Hungarian National Museum.

In general appearance, colour and structure, it is very similar to *P. brevipetiolatus*. It differs by A.R. being nearer 1.0, the wings lacking a sub-apical shadow and by the macrotrichia in the male being present only as a triangular patch at the apex of cell  $R_{4+5}$ ; the cross-vein is darkened. In the female, the macrotrichia are more extensive and are present at the apices of cells  $R_{4+5}$ ,  $M_1$ ,  $M_4$  and anal cell.

DISTRIBUTION. TRANSVAAL: Pretoria (type series); 2 ♂, 5 ♀, Olifantsvlei, viii.54 (*A. D. Harrison*); 1 ♂, 3 ♀, Benoni, viii.54 (*A. D. Harrison*). ANGLO-EGYPTIAN SUDAN: 1 ♂, Amadi, vi.vii.54 (*E. T. M. Reid*).

### *Procladius (Procladius) albitalus* sp. n.

Black, pleura with grey "bloom"; easily distinguished from the other species by the black legs with white basitarsus and wings with two transverse patches of scale-like macrotrichia.

*Male*. Wing length 1.5-2.25 mm.

*Head* and pedicel yellowish brown, mouthparts black, flagellum and plumes black, A.R. 1.3. *Thorax* black or blackish brown, mesonotum shining, pleura with grey "bloom" having a slightly different appearance from the pruinosity so common on Chironomid thoraces. *Legs* black, basitarsi white, L.R. 1.4; tibiae rather thickly clothed with black hairs, anterior tarsi without beard. *Wings* (Pl. I, fig. *h* of female) with normal venation, macrotrichia not uniformly distributed; normal macrotrichia present at apex and round the margin; rather broader, blacker, almost scale-like macrotrichia forming two incomplete transverse bands one at the level of the cross-vein and which expands in the anal cell, and one at the level of  $R_2$ , this band only reaches  $M_{3+4}$ ; veins also scaly. Halteres black. *Abdomen* black with well developed

black hairs. Hypopygium (Text-fig. 13, *b*) with simple styles which lack outer lobes.

*Female*. Similar to the male except that the wings have rather more macrotrichia (Pl. I, fig. *h*) ; antennae with 14 segments.

Holotype male, UGANDA, Kampala, 21.viii.26 (G L. R. Hancock) in British Museum.

DISTRIBUTION of paratypes. KENYA : 2 ♀, Nairobi, ii.1924 (*van Someren*). FRENCH W. AFRICA : 2 ♂, 1 ♀, Upper Volta, Bobo Dioulasso, 21.viii.53 (*J. Hamon*). TRANSVAAL : 4 ♀, Tzaneen, 1.viii.32 (*B. de Meillon*). NATAL : 1 ♀, Eshowe, ix.1930 (*B. de Meillon*).

### *Procladius (Procladius) noctivagus* Kieffer

*Tanypus noctivagus* Kieffer, 1910, *Mem. Ind. Mus.* 2 : 222.

*Trichotanypus niloticus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92 : 189 (SYN. NOV.).

*Trichotanypus nilicola* Kieffer, 1925, *Bull. Soc. R. ent. Egypte*, 1924 : 309 (SYN. NOV.).

The type of *T. noctivagus* is a female and is in the British Museum ; it is clearly the same species as Kieffer later described under the name *nilicola*. He described the colour as "roux carné," whereas in fact it is yellowish with brown mesonotal stripes postnotum and sternopleuron ; he also omitted to mention the dark cloud in the anal cell. In his key he states that the mesonotum is without bands. The specimen is certainly the true type because the mounting and labelling are the same as for other species from the same collection.

The description of *T. niloticus* agrees very well with the same species except that he states that the wings are hyaline. If he can describe *noctivagus* as being without mesonotal stripes, it would be quite easy for him not to notice the wing markings as they are often quite faint and depend a good deal on the lighting.

*P. noctivagus* is a much paler species than *brevipetiolatus*, and is mainly yellow with brown thoracic markings ; wings with similar dark markings, but styles with longer outer lobe.

*Male*. Wing length 2-2.25 mm.

*Head* yellowish brown, palpi dark brown, pedicel reddish brown, A.R. nearly 2. *Thorax* with yellowish background and brown stripes ; prescutellar area yellowish, postnotum and sternopleuron brown. *Legs* yellow, apices of segments narrowly darker, anterior tarsi bearded, L.R. 0.75. *Wings* hairy, very similar to the darker forms of *brevipetiolatus* (See Pl. I, fig. *i* of female) ; cross-vein clouded, dark staining as a broad subapical band and an anal spot, both clothed with darker macrotrichia. Halteres whitish. *Abdomen* mainly yellow, segments each with a narrow basal dark band. Hypopygium (Text-fig. 13, *c*) with outer lobe of style longer than in *brevipetiolatus*.

*Female*. Closely resembles male ; antennae with 13 segments ; thoracic stripes more clear cut, abdomen almost completely yellow, wing markings more distinct (Pl. I, fig. *i*).

Holotype of *T. noctivagus* a female, in the British Museum, type locality,

EGYPT, Suez Canal. The types of *niloticus* (locality, ANGLO-EGYPTIAN SUDAN, S. of Khartoum) and *nilicola* (locality, EGYPT, Maadi) are probably both lost.

DISTRIBUTION. EGYPT: 2 ♀, Moascar, iii.1942 (S. H. Segerman). ANGLO-EGYPTIAN SUDAN: 8 ♂, 8 ♀, Meroe nr. Assuan (S. Hirst); 1 ♀, Alaki, 20.i.23 (S. Hirst); 1 ♂, Halfa (S. Hirst); 1 ♀, Khartoum, i.1923 (S. Hirst); 2 ♂, 1 ♀, ii.1952 and 8 ♂, 1 ♀, 24.i.53, Khartoum (D. J. Lewis).

***Procladius (Procladius) polytomus* Kieffer**

*Trichotanypus polytomus* Kieffer, 1923, *Ann. Soc. ent. Fr.* 92: 190.

In his original description Kieffer states that the female antennae are 15-segmented. I have a series from the southern Sudan near the type locality, closely agreeing in wing markings and colouration with his specimens, but with only 13 segments to the female antenna. I am assuming that either Kieffer made a mistake or else the female he studied was aberrant.

It is a small pale brown species, distinguished from similar pale species by the black spot at the apex of  $R_1$ .

*Male.* Wing length 1.5 mm.

*Head* yellow, palpi dark, pedicel brown, flagellum and plumes pale, A.R. nearly 2. *Thorax* with yellowish background; mesonotal stripes, postnotum and sternopleuron brown. *Legs* very pale, translucent, apices of segments narrowly darkened, L.R. 1.5. *Wings* (see Pl. I, fig. *j* of female) with normal venation; cross-vein, base of  $M_{3+4}$  and apex of  $R_1$  with dark spots; in addition there are four dark shades as follows: a large transverse one at the level of apex of  $R_1$  reaching from  $R_{4+5}$  to  $M_{3+4}$ , a small one at apex of cell  $R_{4+5}$ , one filling posterior fork and a fourth in the anal cell. Macrotrichia present over apical third of wing and round into anal cell. Halteres white. *Abdomen* brown, segments 1-4 with yellow bands occupying their apical halves, remaining segments narrowly pale apically. Hypopygium (Text-fig. 13, *d*) with simple styles, apical spine rather long.

*Female.* Quite similar to male, macrotrichia more densely arranged on wing (Pl. I, fig. *j*); abdomen brown, each segment with narrow pale apex, antennae 13-segmented in all specimens I have seen (Kieffer states antennae of type are 15-segmented).

The holotype, a female from ANGLO-EGYPTIAN SUDAN, Shambe, is probably lost.

DISTRIBUTION: ANGLO-EGYPTIAN SUDAN: 4 ♂, 7 ♀, Yirol, 28.iii.54 and 1 ♀, Adok, 21.xi.53 (E. T. M. Reid).

***Procladius (Procladius) maculosus* sp. n.**

A very small species, white with yellowish mesonotal stripes, distinguished from all other African species by the two transverse rows of spots on the wings.

*Female.* Wing length 1.5 mm.

*Head* chalk white, palpi dark, antennae broken, but pedicel white. *Thorax* white, stripes separate, yellowish brown, postnotum and sternopleuron tinged with yellow. *Legs* translucent white, tips of tibiae slightly darkened, tarsi broken.



*Wings* (Pl. I, fig. *k*) with normal venation ; dark markings in the form of two transverse rows of four spots, one row at the level of the cross-vein, the other at the level of  $R_2$  ; macrotrichia sparse, mostly in the apical third of the wing, but there are a few in the anal cell. *Halteres* white. *Abdomen* white, segments 1-5 faintly tinged with yellowish green at their bases.

*Male*. Not known.

Holotype female, ANGLO-EGYPTIAN SUDAN, Melut, 17.xi.53 (*E. T. M. Reid*) in British Museum.

*Procladius (Psilotanypus) reidi* sp. n.

This is the only bare winged species of the genus known to me from Africa ; none has been described previously.

It is a distinctive species with white body colour, yellowish or reddish brown mesonotal stripes and a black median abdominal stripe ; wings clear but with a small brown spot over r-m cross-vein.

*Female*. Wing length 1.5 mm.

*Head* white, palpi dark, antennae of all specimens broken (holotype has 11 segments left), pedicel white and flagellum slightly darker, flagellar segments moniliform. *Thorax* white ; mesonotal stripes yellowish brown or reddish brown, outer margins dark brown, fused across, but prescutellar area white ; lateral stripes carried backwards on to outer angles of scutellum which is otherwise white ; postnotum black, sternopleuron pale yellowish. *Legs* white, tarsal segments 3-5 black, L.R. 1.5. *Wings* clear and hyaline (Pl. I, fig. *l*), veins colourless, the only markings being a rounded, dark brown spot over r-m cross-vein, venation normal ; membrane without any sign of macrotrichia even at the tip (I have examined a stained wing under high power for the macrotrichial pits and found none). *Halteres* white. *Abdomen* white, with a median longitudinal black stripe which is slightly wider on segment 4.

*Male*. Not known.

Holotype female, ANGLO-EGYPTIAN SUDAN, Adok, 21.xi.53 (*E. T. M. Reid*), in the British Museum.

Paratypes. ANGLO-EGYPTIAN SUDAN : 8 ♀, Melut, 17.xi.53 (*E. T. M. Reid*).

Subfamily **DIAMESINAE**

The Diamesinae occupy a position intermediate between the Tanypodinae and Orthocladiinae. The following is a definition of the subfamily.

Base of  $M_{3+4}$  present ;  $R_{2+3}$  present and distinct, ending in costa well beyond  $R_1$  to which it is not connected ;  $R_2$  absent. Male antenna usually with 13-14 segments, but may be reduced to as few as six ; there are traces of a fifteenth segment in *Protanypus*. Female antenna with 6-8 segments, except in *Protanypus* where there are 14. Pronotum well developed, divided in the middle only in *Heptagyia*.

Only one species, belonging to *Diamesa*, is known to me from Africa south of the Sahara ; there are none described by earlier authors. In a previous paper I referred to a second species, but the material was in extremely poor condition, and on a re-examination I have decided that it does not belong to this subfamily. It is possible

that more species will be found in the mountainous parts of East, Central and Southern Africa, and I am therefore giving a key to the genera.

The latest Revision of the subfamily is that of Pagast (1947, *Arch. Hydrobiol.* **41** : 435-596). He recognizes 12 genera, five of them new, including one described from early stages only. I am treating his new genus *Sympotthastia* as a subgenus of *Pseudodiamesa*, and his genus *Onychodiamesa* together with *Potthastia* as subgenera or synonyms of *Diamesa*.

Edwards (1929) divided *Syndiamesa* from *Diamesa* by the shape of the fourth tarsal segment, a character which was not always easy to appreciate. Pagast uses as characters in generic definition the condition of the dorso-central hairs and the dorsal narrow parts of the eyes, which are easier to use. However, the type species of *Syndiamesa* (*hygropetrica* Kieffer) now falls into *Diamesa* so that *Syndiamesa* can no longer stand.

#### KEY TO GENERA OF DIAMESINAE

1. Pronotum with two forward projecting lobes ; mesonotum thickly covered with hair, except on the stripes . . . . . *Lobodiamesa* Pagast
- Pronotum simple ; mesonotum with hair in the usual three rows only . . . . . 2
2. Dorso-central hairs absent, or very short and decumbent, not arising from distinct pits . . . . . *Heptagyia* Philippi
- Dorso-central hairs long, suberect, and arising from distinct pits . . . . . 3
3. Base of  $M_{3+4}$  basal to posterior fork . . . . . 4
- Base of  $M_{3+4}$  beyond posterior fork . . . . . 6
4. Eyes hairy ; fourth tarsal segment heart-shaped . . . . . *Maoridiamesa* Pagast
- Eyes bare ; fourth tarsal segment cylindrical . . . . . 5
5. Eyes with narrow dorsal part ; second palp segment simple . . . . . *Prodiamesa* Kieffer
- Eyes lacking narrow dorsal part ; second palp segment toothed . . . . . *Odontomesa* Pagast
6. Pronotum hairy all over ; antennae of female 14-segmented . . . . . *Protanypus* Kieffer
- Pronotum bare above ; antennae of female with 6-8 segments . . . . . 7
7. Dorso-central bristles bi- or tri-serial ; eyes with dorsal narrower portion . . . . . *Pseudodiamesa* Goetghebuer
- Dorso-central bristles uniserial, at least anteriorly ; eyes not narrowed above . . . . . *Diamesa* Meigen

#### Genus *DIAMESA* Meigen

*Diamesa* Meigen, 1838, *Syst. Besch. Zweifl. Insekt.* **7** : 12 ; Edwards, 1929, *Trans. ent. Soc. Lond.* **77** : 304 ; Pagast, 1947, *Arch. Hydrobiol.* **41** : 462.

*Syndiamesa* Kieffer, 1918, *Ent. Mitt.* **7** : 101 ; Edwards, 1929, *Ibid.* **77** : 303.

Eyes pubescent or bare, narrow dorsal part not developed. Antenna of female with 7-8 segments ; of male, when fully developed, without trace of fifteenth segment. Pronotum bare or only slightly hairy at sides ; dorso-central bristles uniserial, long and suberect, arising from distinct pits. Male styles simple, tip of coxites not prolonged. Fourth tarsal segment, at least on posterior legs, shorter than fifth and more or less cordiform or bilobed at tip. Base of  $M_{3+4}$  a little distal to posterior fork.

#### *Diamesa (Diamesa) ruwenzoriensis* sp. n.

This species belongs to *Diamesa* in its strictest sense ; the female is very similar to the Palaearctic species *D. culicoides* Heeger, but can be distinguished by the 7-

segmented antennae and brownish wings. The male is a distinctive insect with short 7-segmented antennae similar to those of the female; the hypopygium has only a minute anal point. It is improbable that the males are intersexes (see under "Variation and Differences between the Sexes"), because the two collections were made on quite different occasions; there are species known from other Regions with reduced antennae in the male.

*Male.* Wing length 3.5 mm.

*Head* black, palpi well developed, eyes kidney-shaped, pubescent, without the narrow dorsal part; antennae with seven segments, similar to female, segments 3–6 quadrate, segment 2 twice as long as 3, segment 7 nearly three times as long as 6, no plume hairs present. *Thorax* mainly black, with a good deal of grey pruinosity, especially in the holotype; mesonotum with three black stripes, shoulders and lines of dorso-central bristles grey; acrostichal bristles absent, dorso-centrals uniserial,

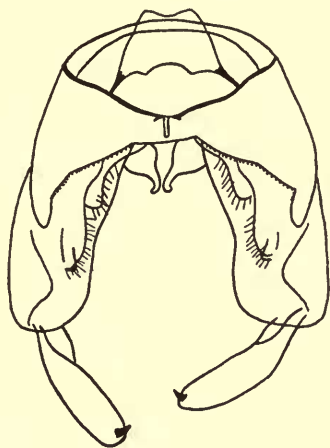


FIG. 14. Male hypopygium of *Diamesa ruwenzoriensis*.

well developed, upright and arising from black pits. *Legs* black, trochanters with a trace of yellow; L.R. 0.6; anterior tarsi not bearded; fourth tarsal segment on all legs shorter than fifth and slightly cordiform, pulvilli absent, empodium well developed. *Wings* with a brown tinge, veins seamed, very similar to female (Pl. I, fig. *m*); microtrichia readily visible under magnification of  $\times 300$ ; costal margin sinuous, costa slightly prolonged. Halteres yellow. *Abdomen* black, segments paler along posterior margin, pleural membrane reddish. Hypopygium (Text-fig 14) with IXth tergite widely emarginate, anal point minute; basal and internal structures as shown; styles simple, oblong, with short spine at apex.

*Female.* Wing length 4.0–4.25 mm.

Exactly similar to the male except for the genital structures. Ovipositor lobes moderately developed, cerci small.

Holotype male and paratypes 3 females, UGANDA, Ruwenzori Range, Namwamba Valley, 10,200 ft., x.1934–i.1935 (*F. W. Edwards*); 5 ♂, Ruwenzori Range, Lake Bujuku, 13,050 ft., 22–28.vii.1952 (*D. S. Fletcher*), all in British Museum.

## SUBFAMILY CLUNIONINAE

For convenience I am dealing with this subfamily here, although their correct place would probably be after the Orthocladiinae. The subfamily may be defined as follows :

Male antennae never plumose, often similar to those of the female. Pronotum completely divided into lateral lobes ; postnotum without distinct furrow ; suture between sternopleuron and anepisternum absent or indistinct (Text-fig. 15). Legs, especially hind pair, usually very long, front coxae enlarged, posterior tibiae without combs. Wings often reduced, venation not unlike Orthocladiinae. Male hypopygium inverted, styles infolded, without distinct terminal spine.

Apart from some *Telmatogeton* species living in mountain streams in Hawaii, all the species are restricted to a marine intertidal habitat. Four species belonging to three genera have been described from S. and E. Africa ; I have material of

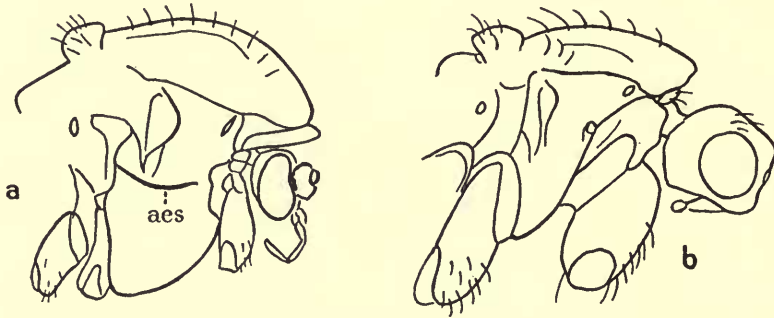


FIG. 15. Side view of thorax of (a) an Orthocladiine and (b) a Clunionine to show presence of anepisternal suture (*aes*) in the former and its absence in the latter. (From Edwards, 1929).

two of them at my disposal. There are excellent published descriptions of all the species and I am confining my account therefore to the important distinguishing features only.

The following generic key is based on that given by Wirth (1949, *Univ. Calif. Publ. Ent.* 8, 151-182) and includes all the known genera, not just those so far recorded from Africa.

## KEY TO GENERA OF CLUNIONINAE.

- |  |                            |
|--|----------------------------|
| 1. Second segment of posterior tarsus not longer than third . . . . .                | 2                          |
| Second segment of posterior tarsus longer than third . . . . .                       | 5                          |
| 2. Second segment of posterior tarsus much shorter than third . . . . .              | <i>Clunio</i> Haliday      |
| Second segment of posterior tarsus subequal to third . . . . .                       | 3                          |
| 3. Wings straplike, reaching to fourth abdominal segment, halteres present . . . . . | <i>Eretmoptera</i> Kellogg |
| Wings vestigial not reaching to abdomen, halteres absent . . . . .                   | 4                          |
| 4. Palpi short, one-segmented ; antennae seven-segmented . . . . .                   | <i>Tethymyia</i> Wirth     |
| Palpi and antennae both 4-segmented . . . . .  | <i>Belgica</i> Jacobs      |



- |   |                             |
|---|-----------------------------|
| 5. Fifth tarsal segment simple or slightly bilobed . . . . .  | <i>Thalassomyia</i> Schiner |
| Fifth tarsal segment deeply trilobed at tip . . . . .   | 6                           |
| 6. Both sexes fully winged . . . . .  | 7                           |
| Both sexes brachypterous . . . . .  | 8                           |
| 7. Legs unmodified, leg hairs weak . . . . .  | <i>Telmatogeton</i> Schiner |
| Front femur of male swollen and with an angular projection near apex interlocking with a basal tibial projection; leg hairs strong, sometimes flattened as appressed scales . . . . . | <i>Paraclunio</i> Kieffer   |
| 8. Wings about as long as thorax, halteres present . . . . .  | <i>Psammathomyia</i> Deby   |
| Wings and halteres minute or absent . . . . .   | <i>Halirytus</i> Eaton      |

### Genus *CLUNIO* Haliday

*Clunio* Haliday, 1855, *Nat. Hist. Rev.* 2: 62; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 370; Stone and Wirth, 1947, *Proc. ent. Soc. Washington* 49: 201-24; Wirth, 1949, *Univ. Calif. Publ. Ent.* 8: 158.

Eyes pubescent; mouthparts reduced; male with well developed wings, microtrichia absent; female lacking wings and halteres; legs stout, pulvilli absent, empodium as large as claws; male hypopygium large, at least half total length of abdomen, styles arcuate or triangular in profile.

There is a single African species described by Hesse. The following brief diagnosis is taken from his description.

### *Clunio africanus* Hesse

*Clunio africanus* Hesse, 1937, *Proc. R. ent. Soc. Lond.* (B) 6: 165-8; Stone and Wirth, 1947, *Proc. ent. Soc. Washington* 49: 220.

*Male.* Wing length 2 mm.

General body colour dark brown, pleura and legs rather paler. Pubescence on body scanty, about four setae in front of wing base, about six in each row of dorso-centrals; leg setae well developed. Interocular space on vertex about half as broad as head across eyes and broader than vertical depth of eyes; eyes rather large. Antennae 11-segmented, flagellum subequal to middle tibia; basal flagellar segment elongate, but slightly shorter than segment 11; 4-10 moniliform, slightly longer than broad; segment 11 subequal to the three preceding segments together. Wings with vein Cu gently curved. Styles somewhat flattened and scapuliform, apical angle rounded and with a few minute recurved spines.

*Female* not known.

Known only from the type series, NATAL, Isipingo, vii. 1935.

### Genus *THALASSOMYIA* Schiner

*Thalassomyia* Schiner, 1856, *Verh. Zool. Bot. Ges. Wien* 6: 218; Wirth, 1949, *Univ. Calif. Publ. Ent.* 8: 166.

*Thalassomyia* Schiner, 1868, *Reise Novara, Zool.* 2: 24 (emend.); Edwards, 1926, *Proc. Zool. Soc. Lond.* 51: 786.

Eyes bare, palpi four segmented, antennae of both sexes similar and with seven segments. Hypopygium very small, legs long, especially the hind pair; third tarsal segment bilobed at tip, fourth short and strongly cordiform, fifth not lobed at tip, empodium very large. Wings fully developed in both sexes, microtrichia present,  $R_{4+5}$  curved and reaching almost to wing tip, squama fringed.

The following East African species is known also from the Marquesas Islands.

### *Thalassomyia africana* Edwards

*Thalassomyia africana* Edwards, 1926, *Proc. Zool. Soc. Lond.* **51**: 787; Edwards, 1935, *Bishop Mus. Bull.* **114**: 88; Wirth, 1947, *Proc. Hawn. ent. Soc.* **13**: 135.

Wing length 2 mm.

General colour dark brown. Wirth (1947) distinguishes this species from the others in the genus as follows: styles slender, with blunt tip bearing two setae at extreme apex; coxite with large thumb-shaped basal lobe which is bare at tip; female cerci long and extremely slender; veins M, Cu and 1A bare of setae; last antennal segment tapered towards the terminal nipple.

Holotype male, TANGANYIKA, Dar-es-Salaam (R. R. Scott) in British Museum. There is additional material from the Marquesas Islands.

### Genus *TELMATOGETON* Schiner

*Telmatogeton* Schiner, 1866, *Verh. Zool. Bot. Ges. Wien* **16**: 931; Schiner, 1868, *Reise Novara Zool.* **2**: 25; Edwards, 1928, *Konowia* **7**: 234-6; Wirth, 1947, *Proc. Hawn. ent. Soc.* **13**: 143-191; Wirth, 1949, *Univ. Calif. Publ. Ent.* **8**: 170.  
*Charadromyia* Terry, 1913, *Proc. Hawn. ent. Soc.* **2**: 292.  
*Trissoclunio* Kieffer, 1920, *Ann. S. Afr. Mus.* **17**: 523.

Fifth tarsal segment deeply trilobed; antennae with seven segments in both sexes; palpi with two segments; both sexes fully winged; pubescence of legs uniform and short; front femur of male simple.

Two species from S. Africa fall into this genus. The following descriptions and key are based on those given by Wirth (1947).

#### KEY TO AFRICAN SPECIES OF *Telmatogeton*

Larger species (wing length 5-6 mm.); mostly blackish in colour; wings smoky brown; scutellum with about 50 setae . . . . . *sancti-pauli* Schiner  
 Smaller species (wing length 3-3.5 mm.); mostly brownish; wings pearly grey; scutellum with about 12 setae on lateral edges . . . . . *minor* Kieffer

### *Telmatogeton sancti-pauli* Schiner

*Telmatogeton sancti-pauli* Schiner, 1868, *Reise Novara Zool.* **2**: 25; Edwards, 1928, *Konowia* **7**: 236; Hesse, 1934, *Trans. R. ent. Soc. Lond.* **82**: 27; Wirth, 1947, *Proc. Hawn. ent. Soc.* **13**: 182.

*Parachunio fuscipennis* Kieffer, 1914, *Ann. S. Afr. Mus.* **10**: 259.

*Trissoclunio fuscipennis* Kieffer, 1920, *Ann. S. Afr. Mus.* **17**: 523.

*Male.* Wing length 4-5 mm.

General body colour blackish brown, shoulders paler, halteres yellowish, wings smoky brown.

Antennae 7-segmented, basal segment large and setose, segment 7 three times as long as broad, tapered; palpi with two segments; eyes with a ring of long stout hairs curved over to form a basket-like protection. Prothoracic lobes small and practically bare; mesonotum arched anteriorly, overhanging head, setae small, arising from light coloured spots; scutellum with about 50 long dark setae, the longest as long as scutellum. Wings with costa, R and base of M more darkly infuscated. Legs long, middle trochanters swollen and with a pad of setae borne on a ventral knob; posterior tibiae with two spurs (not one as stated by Wirth); last tarsal segment trilobed, the median lobe about half length of claws; empodium large, pectinately plumose; claws unevenly bifid, lateral tooth pectinate at tip. Hypopygium turned about  $15^\circ$  from horizontal and stout; styles simple, infolded, flattened and oval; phallosome complex, with a pair of median slender, sinuous sclerotizations with hooked tips and a pair of adjacent long sabre-like plates each with a shorter curved lateral arm.

*Female.* Resembles male, except that all tarsal claws are long, pointed and simple; last tarsal segment more deeply trilobed, mid-trochantal knob smaller than in male. Segment 8 of abdomen laterally compressed, tapering in side view and upcurved to a sharp point formed by the pointed cerci, about one and a half times as long as high.

**DISTRIBUTION.** ST. PAUL I.: 1 ♂, cotype (Novara Reise). CAPE PROVINCE: 1 ♂, 1 ♀, cotypes of *T. fuscipennis*, Cape Town (*Péringuey*); 1 ♂, Sea Point, xi.31-i.32 (*A. Mackie*).

*Habitat.* On rocks covered with growth of algae *Porphyra capensis* and *vulgaris* between tide marks on Atlantic and Indian Ocean sides of Cape and on St. Paul Island, Indian Ocean. The ecology is dealt with by Hesse (1934).

### *Telmatogeton minor* Kieffer

*Paraclunio minor* Kieffer, 1914, *Ann. S. Afr. Mus.* 10: 260.

*Trissoclunio minor* Kieffer, 1920, *Ibid.* 17: 523.

*Telmatogeton minus* Edwards, 1928, *Konowia* 7: 236.

*Telmatogeton minor* Hesse, 1934, *Trans. R. ent. Soc. Lond.* 82: 34; Wirth, 1947, *Proc. Hawn. ent. Soc.* 13: 185.

I have no material of this species, but the papers of Hesse and Wirth enable me to distinguish it from *sancti-pauli* as follows:

Wing length 3-3.5 mm.

Size smaller than *sancti-pauli*, more extensively pale in colour; scutellum with only about 12 hairs; mid-trochanters without marked protuberance in male; wings pearly grey, not darkly infuscated; female abdomen markedly produced, eighth segment over twice as long as high.

Habitat similar to that of *sancti-pauli* but it is less common. Originally described from Cape Town, but also occurs along the south coast on the Indian Ocean.



PRESENTED